

MINES DEPARTMENT.

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**REGULATIONS AND ORDERS**  
**RELATING TO MINES UNDER THE COAL**  
**MINES ACT, 1911.**

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**1926 EDITION.**

(Including Orders up to 31st January, 1927.)

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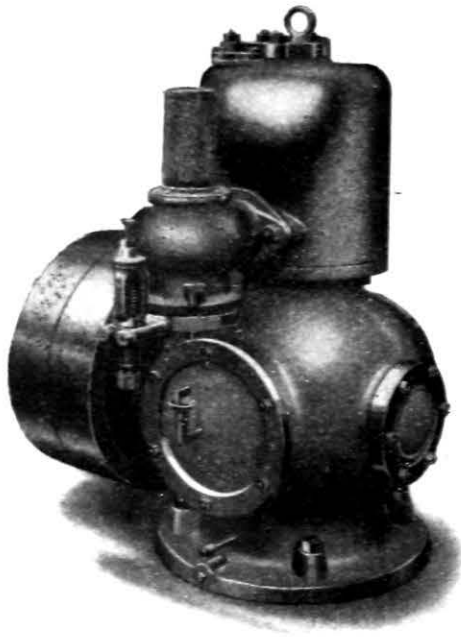
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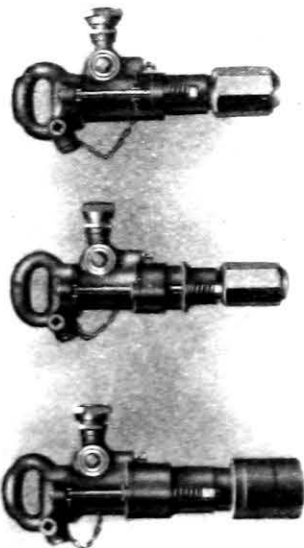
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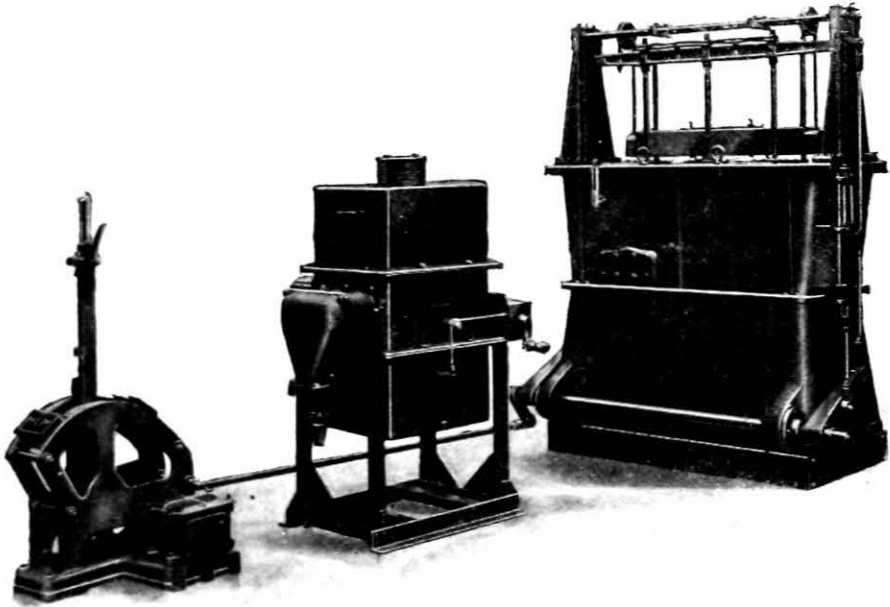


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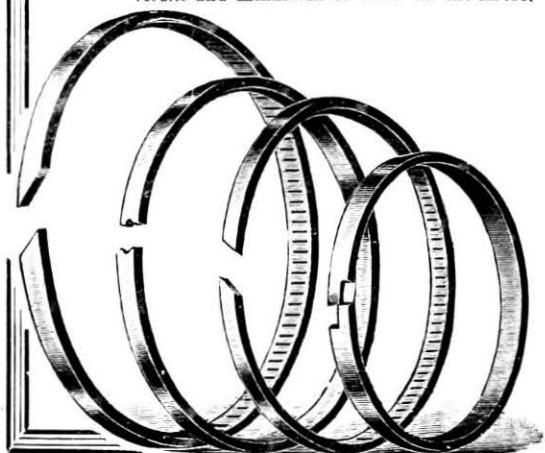
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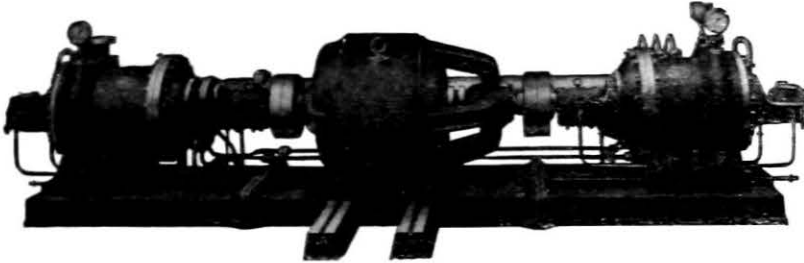
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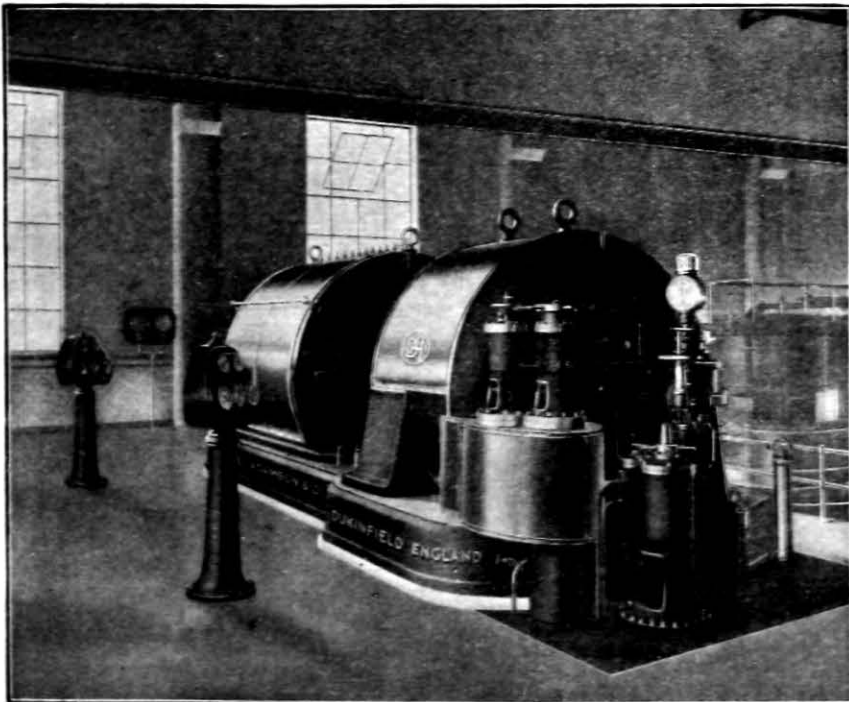


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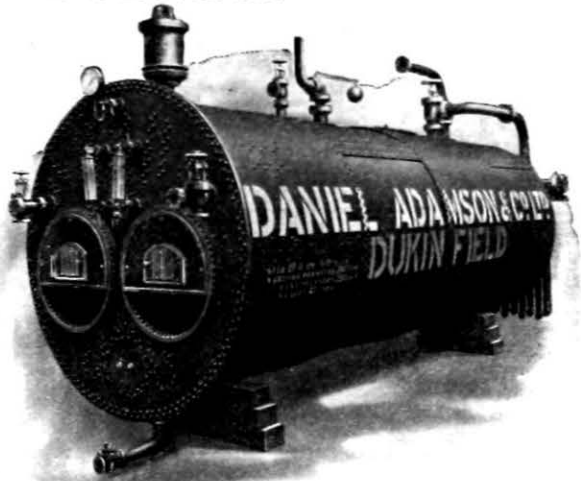
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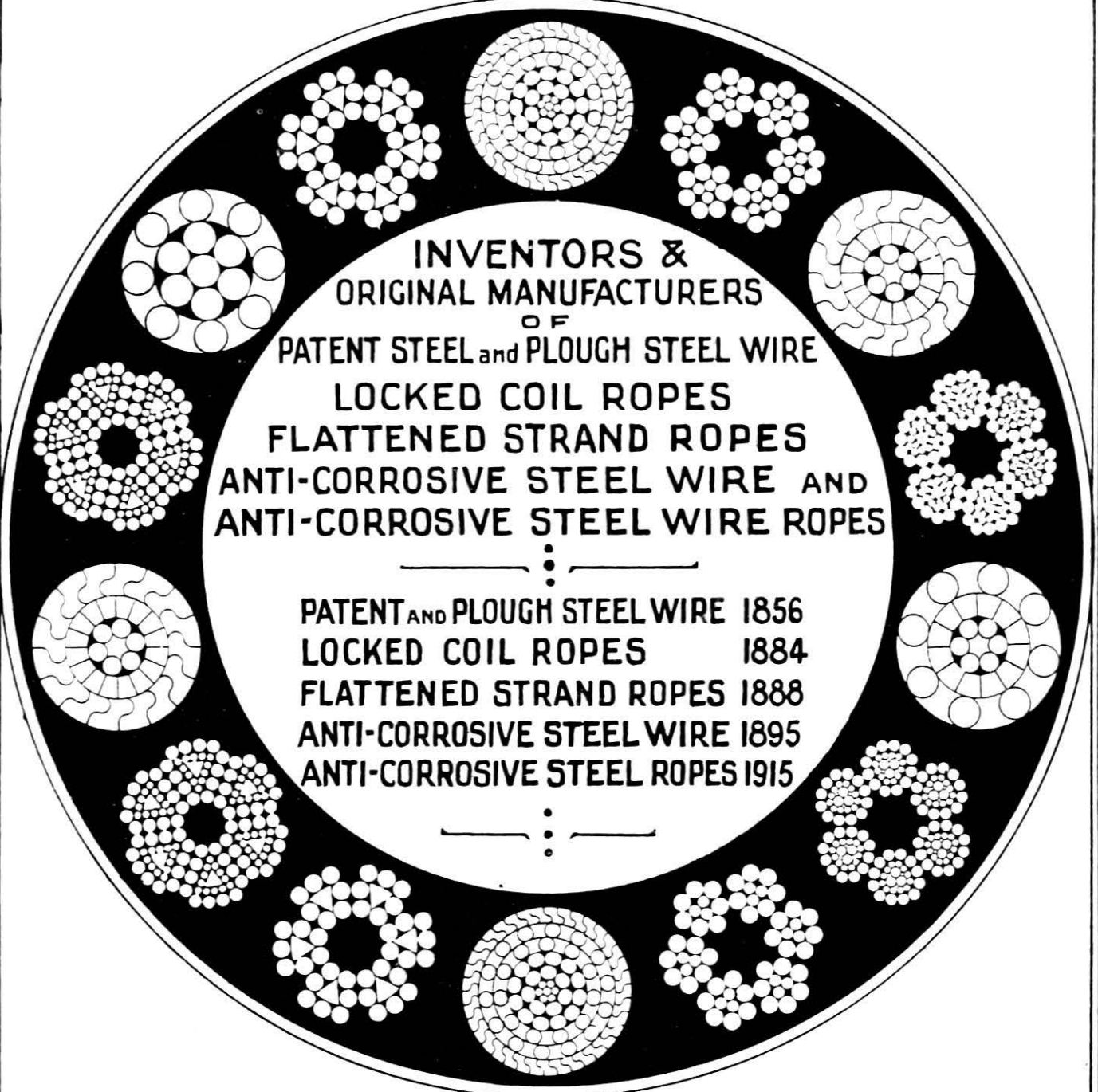
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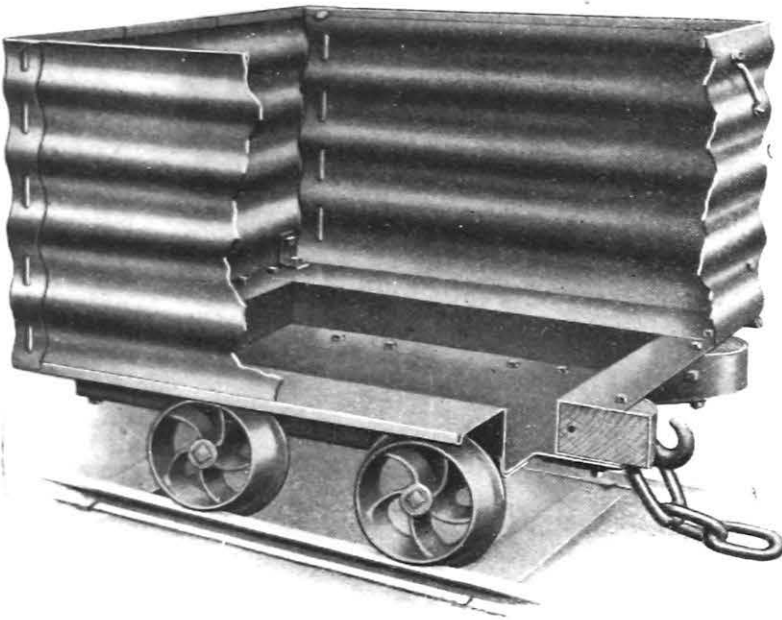


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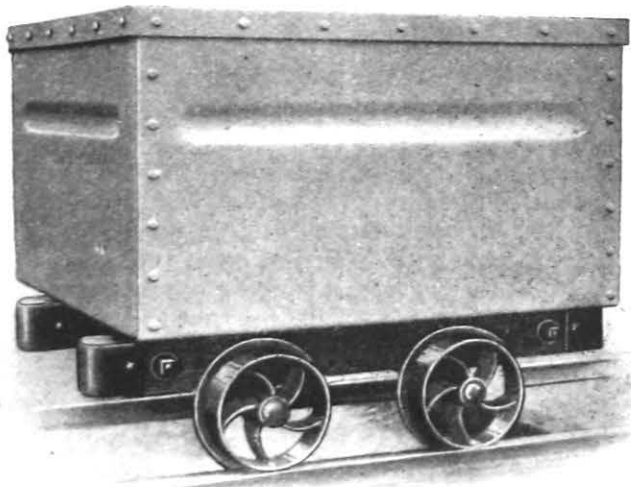
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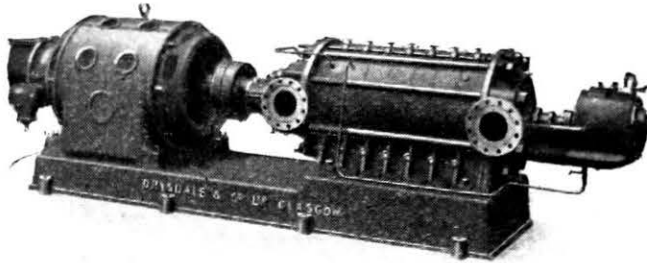
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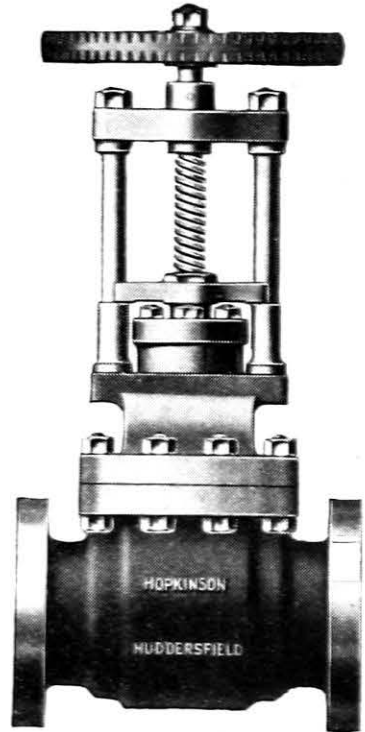
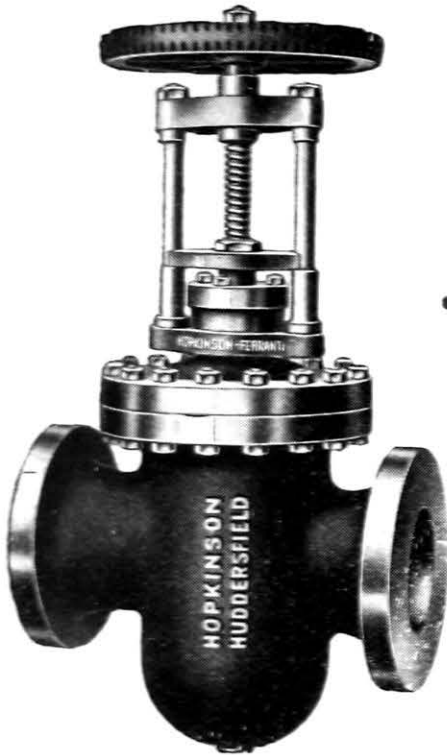
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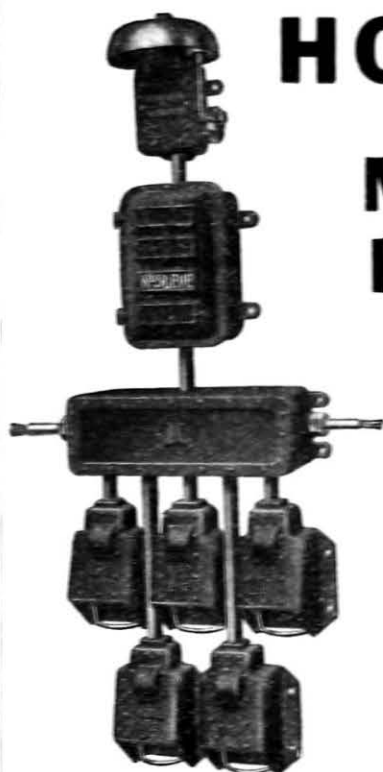
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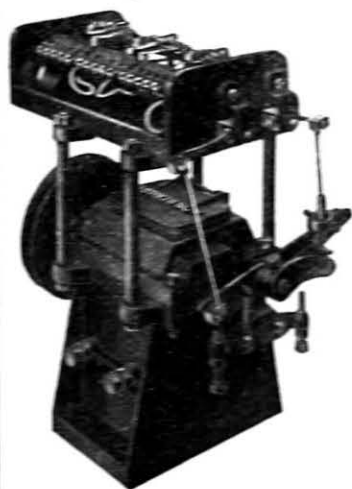


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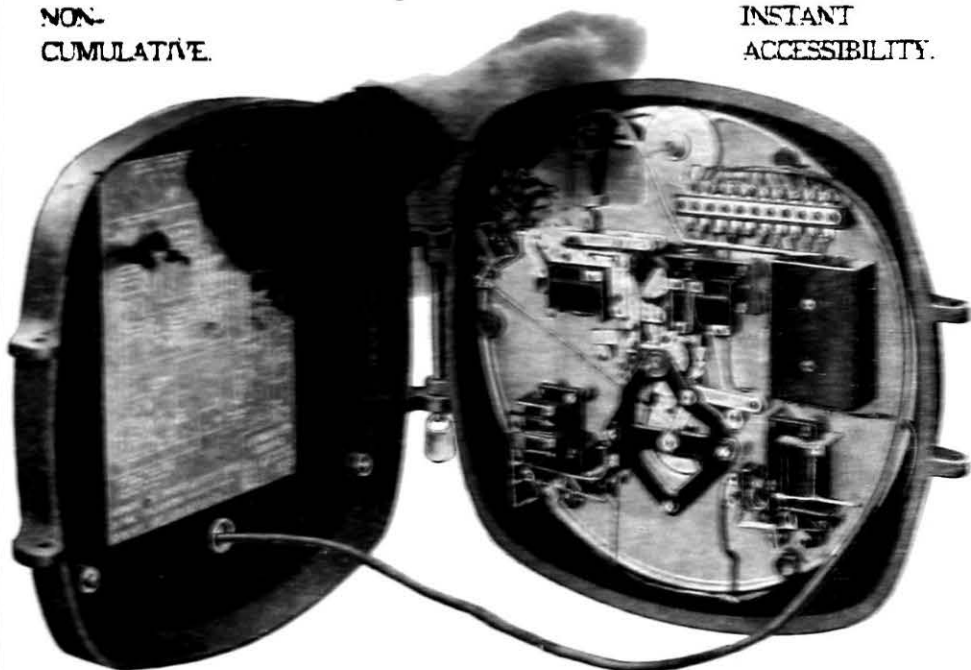
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INSTANT  
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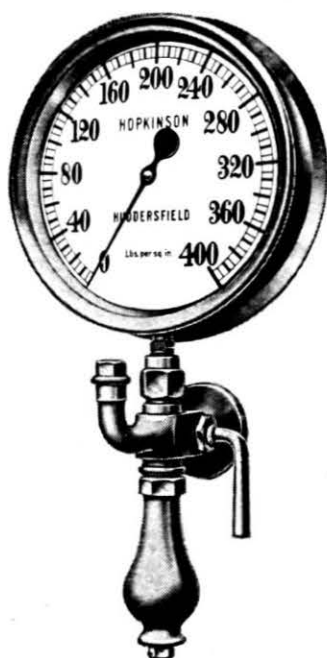
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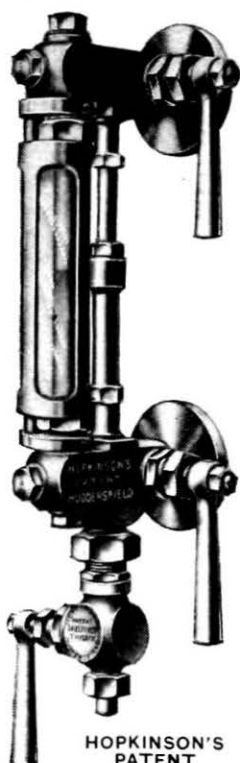
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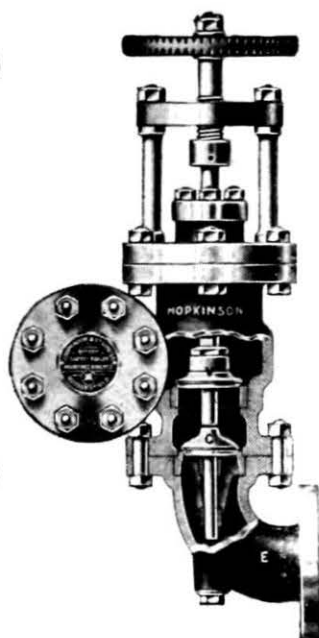
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TELEGRAMS  
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MINES DEPARTMENT.

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**REGULATIONS AND ORDERS**  
**RELATING TO MINES UNDER THE COAL**  
**MINES ACT, 1911.**

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**1926 EDITION.**

**(Including Orders up to 31st January, 1927.)**

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1927.

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## NOTE.

This book contains the Orders (including Regulations) of a general nature relating to mines under the Coal Mines Act, 1911, which were in force on the 31st January, 1927, together with the new Rules made by the Board for Mining Examinations, prescribing the qualifications of applicants for certificates of competency, which come into force on the 1st March, 1927 (see page 97).

To facilitate reference, all Orders are printed to read continuously in the form in which they have effect and a general index (under general subject headings and headings for the different classes of persons employed) is included at the end.

The Safety Lamps and Safety Lamps Glasses Orders, the Breathing Apparatus Orders and the Explosives in Coal Mines Orders containing or relating only to the approval of particular types of safety lamps, safety lamps glasses, breathing apparatus or permitted explosives are too long to reprint in full and, instead, lists have been inserted of :—

- |  |   |
|--|---|
| (1) Approved types of Safety Lamps   | } with a reference to<br>the Orders containing<br>the detailed specification<br>of each type. |
| (2) Approved types of Safety Lamps<br>Glasses  |   |
| (3) Approved types of Breathing<br>Apparatus, and  |   |
| (4) " Permitted Explosives," stating the permissible maximum charge of each explosive and giving a reference to the Order in which the explosive is defined. |   |

Lists are also included in the Appendix of :—

- (5) Institutions approved under subsection (6) of Section 9 (Managers' and Under-Managers' certificates).
- (6) Institutions approved under subsection 1 (b) of Section 15 (Firemen's certificates).
- (7) Courses of training approved under the Coal Mines (Qualifications of Surveyors) Order, and
- (8) Societies whose First Aid certificates have been approved for the purposes of the General Regulations, and of the Rules made by the Board for Mining Examinations as to the qualifications of applicants for first and second class certificates of competency.

Section 1 of the Mining Industry Act, 1920, established a "Mines Department" of the Board of Trade under a Secretary for Mines, and enacted that all powers and duties of the Board of Trade in relation to mines and the mining industry shall, subject to the directions of the Board, be exercised and performed through the Secretary for Mines; while Section 2 transferred to the Board of Trade all the powers of a Secretary of State under enactments relating to mines and quarries. Accordingly, in all the Orders made by the Secretary of State which are printed herein *for* "Secretary of State" and "Secretary of State for the Home Department" *read* "Board of Trade"; and *for* "Home Office" *read* "Mines Department."

Mines Department,  
Dean Stanley Street,  
Millbank, S.W.1.  
*January, 1927.*

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# COAL MINES ACT, 1911.

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## General Regulations.

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1. GENERAL REGULATIONS, DATED JULY 10, 1913 (S.R. & O., 1913. No. 748).

As amended May 19, 1914 (S.R. & O., 1914. No. 710) and July 30, 1920 (S.R. & O., 1920. No. 1423).

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### PART I.

#### *General.*

(1.) It shall be the duty of the manager and under-manager to carry out and to the best of their ability enforce the provisions of every Order\* in force under the Act regulating the supply, use and storage of explosives, and it shall be the duty of all persons employed in or about the mine to comply with the provisions of the said Orders.

(2.) Every notice required by the regulations of the mine to be posted up shall be posted up in some conspicuous place where it may be conveniently read or seen by the persons affected, and so often as it becomes defaced, obliterated or destroyed, shall be renewed with all reasonable despatch.

(3.) No person shall enter the cage until authorised to do so by the onsetter or banksman, as the case may be ; or leave the cage until it shall have stopped at the landing place, and persons while waiting at the top or bottom of the shaft or any entrance into the shaft or while in the cage shall behave in an orderly manner and shall obey the directions of the banksman or onsetter, as the case may be, and shall not impede the banksman or onsetter in the discharge of his duties.

The banksman or onsetter, as the case may be, shall not when persons are being raised or lowered signal the cage away until the gates or other rigid fences with which the cage is provided are in position, and no person other than an official or person authorised in writing by the manager to give signals shall while riding in the cage interfere with the gates or fences.

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\* See the Explosives in Coal Mines Order of the 1st September, 1913, as amended by subsequent Orders, pages 66 to 77.

(4.) Subject to any directions that may be given by any official of the mine, no workman shall, except so far as may be necessary for the purpose of getting to and from his work or in case of emergency or other justifiable cause necessarily connected with his employment, go into any part of the mine other than that part in which he works, or travel to or from his work by any road other than the proper travelling road.

(5.) Every workman engaged at the face, or in stonework, or in timbering, shall carefully examine his working place before commencing work and before recommencing work after the firing of a shot, and after any interruption of work during the shift. Where several persons are working together and one of them is in charge, the examinations required by this regulation shall be made by the man in charge.

(6.) Where the work of erecting the supports of the roof and sides of working places is done by the workmen employed therein, it shall be the duty of the workmen to carry out the requirements of Section 50 of the Act, and to comply with the directions contained in the notice required by that Section.

(7.) If any person shall cause, or become aware of, any obstruction in or interference with the ventilation, or of any stagnation or impurity in the air, of any part of the mine, or of any dangerous defect in any part of the roof or sides, or of any other source of danger, he shall, if it falls within the scope of his duties to remedy such obstruction, interference, stagnation, impurity, defect, or other source of danger, immediately proceed to take the steps necessary for the purpose, and if not he shall immediately inform the manager, under-manager, fireman, examiner or deputy, or other official, and shall, if he is working at the place where the danger exists, cease all work at that place.

(8.) If a sufficient supply of material for supporting the roof and sides of any working place is not available at the place appointed by the Act, the workman shall withdraw from the working place and report the circumstance to the fireman, examiner or deputy or other official, and a note of the report shall be entered by the person to whom it is made in the report for the day, if any, which he may be required to make.

(9.) No person shall, without authority, pass beyond any fence or danger signal or open any locked door.

(10.) No person shall deface or remove any notice which may be set up, or any marks which may be made in any part of the workings for the guidance of the workmen or for any other proper purpose connected with the working of the mine.

(11.) No person shall brush or waft out gas.

(12.) No person shall allow any burning wick or part of a wick or other burning material to lie about in the mine, and every workman on leaving his working place shall take his light or lights with him.

(13.) Every person using a safety lamp shall examine the same externally, and assure himself that it is locked and in good order

before entering the mine, and shall from time to time while in the mine examine the lamp to see that it is in safe working order ; and he shall, when he has completed his shift, return the lamp to the lamproom. If the lamp is injured while in his possession, he shall at once carefully extinguish the light.

(14.) No person shall place a safety lamp on its bottom unless it is necessary to do so for the safe performance of any particular work or unless authorised by the manager ; and in all cases whilst a person is at work it shall be placed at least two feet from the swing of the pick, hammer or other tool.

(15.) Should any person find himself in the presence of inflammable gas, he shall not throw away his lamp or attempt to blow it out, but shall shelter it, hold the lamp near the floor, avoid jerking it, and take it steadily into fresh air. If the gas fires in the lamp where he cannot take it into fresh air, he shall smother out the light or extinguish it in water.

(16.) No person shall when trying or examining for the presence of gas with a safety lamp, raise the lamp higher than may be necessary to allow the presence of gas to be detected.

(17.) Every workman working at the face shall to the best of his power carry on his work so as at all times to leave a free passage for the air current. He shall also to the best of his power leave his working place at the end of his shift in such condition as to allow of work being safely resumed therein ; and if he finds it impossible to do so he shall fence it off and report the fact as soon as possible to the fireman, examiner or deputy, or other official.

(18.) Every person having occasion to pass through any door or canvas screen or flap shall carefully close the same.

(19.) No person shall sleep whilst below ground in the mine or whilst in charge of any winding, hauling, ventilating, or signalling machinery or apparatus, or boilers.

(20.) No unauthorised person shall work or interfere with any signalling apparatus in or about the mine.

(21.)—(a) The onsetter at any entrance into a shaft which is provided with a fence not worked by the cage or cages, shall not begin to remove the fence until either the cage is stopped at the entrance or it has reached such a position in the shaft that by the time the fence is removed the cage will be opposite the entrance, and shall close the fence immediately he has signalled the cage away, and shall not permit any other person to remove the fence while he is on duty.

(b) Reasonable protection against things falling down the shaft shall be provided for persons engaged in loading or unloading cages.

(22.) No person shall attempt to go on or across the uncovered space of the shaft bottom, except for the purpose of working in the shaft bottom, and no person shall be allowed to work in such space unless the cages are stopped.

(23.) Trains run for the conveyance of workmen, whether above or below ground and whether on the premises of a mine or on a line or siding to which Section 111 of the Act applies,\* shall be under the entire control of a person appointed to accompany and have charge of the train, and no person shall attempt to get into or out of the train when in motion nor ride upon the footboard (if any) or upon the buffers or couplings, nor refuse to comply with the directions of the person in charge, nor in any way obstruct or interfere with such person in the discharge of his duties, and any person failing to comply with this regulation shall be reported by the person in charge to the manager or under-manager.

(24.) Every person having charge of a horse, pony, mule or donkey shall drive it carefully and shall observe any directions that may be given to him by the horse keeper or by the official under whose direction he works.

(25.)—(a) No person below ground shall ride upon any animal, nor, except by permission of the manager or under-manager, upon any tram, tub or other contrivance drawn by a horse or other animal.

(b) No person shall ride on any haulage rope.

(26.) No person when taking a tub by hand down an incline of which the gradient exceeds one in twelve shall go in front of the tub; and in every case where the conditions are such that a person cannot control the tub by hand from behind, he shall not take the tub down unless some contrivance is provided to enable him to control the tub.

(27.) No person shall be in or about the mine in a state of intoxication, or, without permission of the manager, take or bring any intoxicating liquor on or in the mine, and no person shall throw any stone or other missile, or fight or behave in a violent manner, in or about the mine.

(28.) No person employed in or about the mine shall negligently or wilfully do anything likely to endanger life or limb in the mine, or negligently or wilfully omit to do anything necessary for the safety of the mine or of the persons employed therein.

(29.) Every workman receiving in or about the mine any personal injury caused by an explosion of gas or dust or any explosive or by electricity or overwinding or any other special cause specified by an Order† under Section 80 (1) (iii) of the Act, or any personal injury causing him to absent himself from his work, shall as soon as possible report the same to one of the officials, and if required by the official shall forthwith proceed to the appointed place for First Aid treatment.

(30.) The manager shall appoint a competent person or persons to keep a correct record of the number of persons going below

\* Section 111 of the Act applies to any line or siding used in connection with a mine and not being part of a railway within the meaning of the Railway Employment (Prevention of Accidents) Act, 1900, *i.e.*, not being part of a railway used for the purposes of public traffic.

† No Order under Section 80 (1) (iii) has at present been made.

ground and returning from below ground daily, and if required by the manager every person shall immediately before going below ground and after returning from below ground record his presence in accordance with a system approved by the inspector of the division.

(31.) The manager shall cause to be posted up at the pit head where it may be conveniently seen by the persons employed a sketch plan of the mine showing the main roads, the means of egress from each part of the mine to the surface, and the telephone stations underground, and so often as the same becomes defaced, obliterated or destroyed shall cause it to be renewed with all reasonable despatch.

(32.) Where by the Act or Regulations of the mine any duty is imposed upon or authority given to any fireman, examiner or deputy, that duty in cases of emergency may be fulfilled or that authority exercised by and at the discretion of any official his superior at the mine and duly qualified to perform such duties.

(33.) Every person before engaging any helper, drawer or other assistant shall acquaint the manager, under-manager (if any) or any other official of the mine superior to the firemen, examiners or deputies, and obtain his sanction.

(34.) Every official of the mine shall carry out the duties assigned to him by the manager, and shall carry out and enforce those provisions of the Act and of the Regulations and Orders made thereunder which relate to the matters in respect of which such duties have been so assigned.

#### *The Manager.*

(35.) The manager shall appoint in writing to be officials of the mine such number of competent persons as will be sufficient to secure a thorough supervision of all the operations in or about the mine and the enforcement of the requirements of the Act and of the Regulations and Orders made thereunder. He shall assign their duties to the several officials of the mine, and shall to the best of his power see that each official understands, and carries out and enforces those provisions of the Act and of the Regulations and Orders made thereunder which relate to the matters in respect of which duties are assigned to him.

(36.) He shall give attention to and cause to be carefully investigated, any representations or complaints that may be made to him as to any matter affecting the safety or health of persons in or about the mine.

(37.) He shall appoint the stations required by Section 63 and the lamp stations, if any, in pursuance of Section 34 (1) (iii) of the Act, and cause their positions to be indicated by notices constructed of durable material.

(38.) He shall see that a sufficient supply of proper materials and appliances for the purpose of carrying out the provisions of the Act and ensuring the safety of the mine and persons employed therein is always provided, and, if he be not the owner or agent

of the mine, he shall report in writing to the owner or agent when anything is required for the aforesaid purpose that is not within the scope of his authority to order.

(39.) He shall determine and state in a notice which shall be kept posted up at the pit head the number of persons to be allowed to ride in a cage at one time, or, where a cage has more than one deck, on each deck of the cage. When men are being raised from the pit bottom, if more than one deck is used, the top deck shall be loaded with men first, but this shall not apply when the decks are simultaneously loaded or when a balanced platform is used for loading the cages.

(40.) If no under-manager has been appointed for the mine, the manager shall carry out the duties imposed by these Regulations on the under-manager.

#### *The Under-Manager.*

(41.) It shall be the duty of the under-manager, as well as of the manager, to enforce to the best of his power the provisions of the Act and of the Regulations and Orders made thereunder, and he shall give (subject to the control of the manager) such directions as may be necessary to ensure compliance with those provisions and to secure the safety of the mine and the safety and health and proper discipline of the persons employed therein.

(42.) He shall give attention to and cause to be carefully investigated, any representations or complaints that may be made to him as to any matter affecting the safety or health of persons in or about the mine.

(43.) He shall, unless an official between himself and the firemen, examiners or deputies has been appointed, make arrangements for their meeting him daily for the purpose of conferring on matters connected with their duties; and shall also make arrangements to meet the other underground officials daily for the like purpose.

(44.) He shall to the best of his power see that all necessary materials and appliances are sent into the districts as required, and he shall report at once to the manager any deficiency in the supply of such materials and appliances.

(45.) He shall from time to time carefully examine all travelable parts of the mine whether frequented by workmen or not.

#### *Officials other than the Manager and Under-Manager and the Firemen, Examiners or Deputies.*

(46.) Every person appointed by the manager to be an official of the mine shall to the best of his power see that the persons under his charge understand and attend to their respective duties.

(47.) When any person is appointed to be an underground official of the mine superior to the firemen, examiners or deputies, but inferior to the manager or under-manager, he shall be a person of not less than twenty-three years of age, holding either

a second-class certificate of competency or a fireman's certificate under the Act. He must also have had at least three years' practical experience underground in a mine.

(48.) When any person is appointed to be an underground official of the mine superior to the fireman, examiner or deputy, but inferior to the manager and the under-manager :—

(a) He shall confer daily during his shift with the firemen, examiners or deputies and other officials of the mine or that part of the mine in respect of which he is appointed, on matters connected with the state of the mine or that part of the mine, and if the mine is worked by a succession of shifts he shall not leave the mine without communicating with the person succeeding him, if any, and shall give him such information as may be necessary for the safety of the mine and of the persons employed therein.

(b) He shall examine daily the reports of the firemen, examiners or deputies under his charge, and see that they are properly recorded.

*Firemen, Examiners and Deputies.*

The following regulations shall not apply to shafts in the course of being sunk.

(49.) Each fireman, examiner or deputy shall in the district of the mine assigned to him carry out in a thorough manner all his statutory duties. He shall to the best of his power see that the workmen under his charge understand and carry out their respective duties under the Act and Regulations and Orders made thereunder and any directions with a view to safety which may be given to them.

(50.) The examination which the fireman, examiner or deputy is required to make before the workmen enter the district, shall be commenced and completed within the two hours immediately preceding the commencement of work in the district. On the completion of the inspection he shall proceed to the appointed station where he shall either meet the workmen and instruct them as to their places of work and as to any special precautions necessary to be observed by them, or report to the incoming fireman all information necessary to enable the latter to do so.

Where safety lamps are required to be used, a competent person shall externally examine the safety lamp of every workman before passing the station and see that it is in safe working order and securely locked, before permitting him to go beyond such station.

A fireman, examiner or deputy shall check the number of workmen under his charge, and shall record the number in his report.

(51.) Where in any place danger from gas or any other cause is found by him he shall fence off all the approaches to the place so that it cannot be inadvertently entered, and shall mark the place by a danger signal.

(52.) If the mine is worked by a succession of shifts he shall not leave the mine without conferring with the fireman, examiner or deputy succeeding him, and shall give him such information as may be necessary for the safety of his district and of the persons employed therein.

(53.) If any case of damage to a safety lamp in his district is reported to him or comes to his notice, he shall ascertain and record in his report the cause and nature of the damage.

(54.) He shall see that all doors, stoppings, brattice and fences in his district are maintained in good order.

(55.) Where brattice or air pipes are required by the manager or under-manager to be used for the ventilation of the working places the fireman, examiner or deputy shall see that they are kept sufficiently advanced to ensure that an adequate amount of air reaches the working faces.

(56.) He shall from time to time during his shift examine for gas at the ripping or brushing, and also at the edges of the gob, goaf or waste, and shall observe the condition of the roof in the gob, goaf, or waste so far as it can be seen from the edges thereof.

(57.) He shall see that every ventilation door is so fixed and maintained that it will fall to and close automatically, and shall also to the best of his power see that no such door is fastened, or propped, back on its hinges.

(58.) If he finds any of the ropes, chains, signals, brakes, jig wheels and posts, or other apparatus in actual use in his district, to be in an unsafe condition, he shall stop the use of the same.

(59.) He shall report as soon as may be to a superior official all accidents, dangerous occurrences or defects which may come to his knowledge.

(60.) Where one of the two ways affording means of egress from the district to the surface, provided in accordance with Section 36, subsection 3, of the Act, is not ordinarily used for travelling he shall travel at least once in every quarter the whole of such way, in order to make himself thoroughly acquainted with the same.

(61.) At the termination of work of a shift in a district the fireman, examiner or deputy who is in charge of the district before he himself leaves the district, or other competent person appointed by the manager or under-manager for the purpose, shall ascertain that all unnecessary lights are extinguished, that all main doors are closed and that the ventilation is taking its proper course. This requirement, so far as it refers to doors and ventilation, shall not apply where the shift is succeeded by another shift so that work is carried on without any interval in the district, nor shall it apply so far as it refers to lights where the shift is succeeded by another shift which is timed to enter the district within 15 minutes of the preceding shift leaving.

(62.) He shall have power to send out of the mine any workman under his charge infringing or attempting to infringe any provision of the Act or Regulations or Orders made thereunder or



failing to carry out any direction given him with regard to safety, and shall report in writing any such infringement or attempted infringement or failure to the manager or under-manager at the end of his shift.

#### *Winding Enginemen.*

For the purpose of the following regulations, cage includes kibble.

(63.) Every winding engineman (unless some other competent person is specially appointed for the purpose by the manager) shall, at the commencement of or during his shift, carefully examine the external parts of his engine, the drum, the ropes upon the drum, the brakes, the signal bell and the indicator showing the position of the cage in the shaft, and the automatic contrivance, if any, for preventing overwinding. If any defect likely to affect the proper working of the engine is discovered then or at any other time, he shall not commence or continue winding until the matter has been reported to the manager, or under-manager, or to the official under whose direction he works, and he shall not resume winding until instructed to do so by the manager, under-manager or official as aforesaid.

(64.) Unless some other person is specially appointed for the purpose, he shall during his shift keep the engine and apparatus connected therewith under his charge properly cleaned and oiled.

(65.) He shall on no pretext leave the handles whilst the engine is in motion, or when anyone is in the cage.

(66.) Should a signal be given indistinctly, or should he have any doubt about a signal, he shall on no account set his engine in motion until a fully understood signal is received.

(67.) Before raising or lowering any person after any cessation of winding, exceeding two hours, he shall run the cage or cages at least once between the shaft top and the lowest drawing level in order to ascertain whether everything is in order, and if any defect is discovered likely to affect the proper working of the winding apparatus he shall not commence winding until the matter has been reported to the manager or under-manager, or to the official under whose direction he works, and he is instructed to do so by the manager, under-manager or official as aforesaid.

(68.) He shall not allow any unauthorised person to be in the engine house, nor shall he, without the written permission of the manager or of the official under whose direction he works, allow anyone to work the engine. He shall in no circumstances permit anyone, except with the authority in writing of the manager, to work the engine while persons are being raised or lowered in the shaft.

#### *Persons in Charge of Ventilating Machines.*

The following regulations shall not apply to any auxiliary fan placed underground, which does not contribute to the general ventilation of the mine or of any ventilating district of the mine.

(69.) The owner, agent or manager shall cause to be provided in connection with every ventilating fan driven by mechanical power a water gauge and either an automatic indicator registering the number of revolutions of the fan or an automatic indicator registering the water gauge.

(70.) The person in charge of any ventilating machinery driven by mechanical power shall keep the machinery running at the speed ordered by the manager or under-manager, and shall examine the machinery and observe the indicators at intervals which in the case of mines in which safety lamps are required by the Act or the regulations of the mine to be used shall be of not more than half an hour or such longer time as may be approved by the inspector of the division and in the case of other mines shall be of not more than two hours.

(71.) He shall immediately report to the official under whose direction he works any damage to, or defect or derangement in, the machinery.

(72.) He shall from time to time observe the ventilating pressure as indicated by the water gauge, and where an automatic indicator registering the water gauge is not in use, he shall at the end of each period of two hours enter in a book to be provided by the manager the number of revolutions of the fan and the pressure shown by the water gauge at the end of the period.

(73.) In the event of a stoppage of the machinery or of any unusual variation of the water gauge he shall at once inform the official under whose direction he works.

#### *The Boiler Minder.*

(74.) The person appointed to attend to any boiler shall from time to time throughout the day examine the boiler, feed-apparatus, safety valves, and other fittings, and dampers, and see that they are in good working order ; and shall at once report to the official under whose direction he works any defect or derangement in the same.

(75.) He shall not, except with the authority of the official under whose direction he works, alter or permit anyone to alter the weight on any safety valve, and only weights made for the purpose shall be used on any safety valve.

(76.) He shall maintain the water in each boiler as nearly as practicable at the proper working level, but if it becomes too low, he shall at once lower the dampers, and damp down the fire and if necessary draw the same, and report the circumstances to the official under whose direction he works. He shall also see that the pressure of steam fixed by the manager is on no account exceeded.

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## PART II.

### *Air Measurements.* [Section 29, subsection (2).]

(77.) The points at which the quantity of air shall be measured in pursuance of subsection (2) of Section 29 of the Act shall be as follows :—

- (a) In the main intake airways of every seam as near as practicable to the downcast shaft ;
- (b) In every split as near as practicable to the point at which the split commences, and
- (c) In each ventilating district at or near as practicable to a point 100 yards back from the first working place at the working face which the air enters.

### *Use of Electric Lamps other than locked Safety Lamps.* [Section 32.]

(78.) In any mine or part of a mine in which safety lamps are required to be used, electric lamps, if enclosed in air-tight fittings and having the lamp globes hermetically sealed, may, subject to the provisions of the Act and any Regulations made thereunder as to the use of electricity in mines, be used within the following limits :—

- (a) On main intake airways and haulage roads ventilated by intake air up to within 300 yards of the first working place at the working face which the air enters.
- (b) On main return airways within 300 yards of the bottom of the upcast shaft if that shaft is regularly used for the purpose of winding persons or minerals but not within 300 yards of the last working place at the working face which the air leaves.

### *Character of Winding Apparatus, &c.* [Section 40 (1).]

(79.) In every mine which is not a small mine\* the apparatus for raising and lowering persons to or from the surface, hereinafter called the winding apparatus, in any shaft which is more than 150 feet in depth, shall be worked by mechanical power.

(80.) Winding apparatus worked by mechanical power :—

- (a) shall be so designed, constructed and maintained that, with the power provided, the raising and lowering of persons can be carried out with ease, regularity and safety ;
- (b) if installed after the date on which these regulations come into force,† shall have the drum shafts, if 10 inches or more in diameter, bored longitudinally at the centre ;
- (c) shall be firmly connected to a rigid foundation so as to prevent any material movement of the apparatus as a whole.

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\* “ ‘ Small mine ’ means a mine in which the total number of persons employed below ground does not exceed thirty.” Coal Mines Act, 1911, Section 122.

† *i.e.*, after September 15, 1913.

12 GENERAL REGULATIONS :—CAPPING OF ROPES, EXEMPTIONS FROM PROVISION REQUIRING TWO MAIN INTAKE AIRWAYS.

(81.) Where winding apparatus is worked by other than mechanical power it shall be efficiently constructed and maintained and provided with a locking device or brake sufficient in itself to hold the load in the shaft at any point.

(82.) All cage chains in general use shall be annealed once at least in every six months, and detaching hooks shall be cleaned and refitted once in every three months.

*Capping of Winding and Hauling Ropes.* [Sections 40 (5) and 46.]

(83.) No mode or type of capping shall be used which fails to withstand a strain :

(a) in the case of a winding rope, of at least seven times the weight of the maximum load carried at any time by the capel ;

(b) in the case of a hauling rope, of at least 60 per cent. of the breaking strain of the rope.

(84.) A competent person appointed in writing by the manager shall, whenever a winding rope is capped or re-capped, superintend the work, and see that it is properly carried out.

(85.) In no case shall the capel of a round winding rope be attached to the rope by the use of rivets passing through the rope.

(86.) In those forms of capping in which the wires at the end of the rope are bent back on the rope itself to form a cone, wedges of a soft metal or wedges formed by the lapping of soft wire shall be placed between the rope and that portion which is bent back. This regulation shall not apply to hauling ropes if mineral only is hauled or if the gradient is less than 45°.

(87.) If white metal is used in the capping of ropes, the composition of the white metal shall be such that its melting point is under 750° Fahr.

(88.) Where white metal is used in the capping of ropes the untwisted wires shall be thoroughly cleaned, and, before the white metal is poured into the socket, the latter shall be heated or warmed.

*Exemptions from the Provision requiring Two Main Intake Airways.* [Section 42 (1).]

(89.) The provision in Section 42, subsection (1), of the Act requiring two main intake airways shall not apply :

(a) To any seam the coal of which is so liable to spontaneous combustion that the provision of a second main intake airway in such seam would increase the risk of fire.

(b) To any seam where, owing to the character of the strata or the nature of the pressure, the cost of making or maintaining two main intake airways in that seam might be so great as to prevent the seam being worked at a profit.

- (c) To any part of a seam where the mineral field leased or owned is not of sufficient width to allow the distances required by the regulations of the mine to be maintained between the roads in such part.
- (d) To mines of stratified ironstone in the Cleveland District, to mines of oil shale, or to mines in any other district as respects which the Board of Trade are satisfied that similar conditions prevail.
- (e) To any mine in which the number of persons employed below ground does not at any one time exceed one hundred.
- (f) To any seam which is naturally wet throughout.

If any question arises as to whether any of the foregoing exemptions applies to a mine or seam, that question shall be determined in the manner provided by the Act for settling disputes.\*

(90.) The distance from the downcast shaft within which the two main intake airways shall not be required to be provided shall be the distance between the shaft and the edge of the shaft pillars. In the case of an inclined shaft or level entrance not driven in the coal seam the distance shall be the distance between the point where the shaft or entrance strikes the seam and the edge of the pillar left to support the shaft or entrance. In the case of an inclined shaft or level entrance driven in the coal seam, the distance shall be two hundred yards from the mouth of the shaft or entrance.

*Construction of Stoppings.* [Section 42 (3).]

(91.)—(a) All stoppings between main intake and main return airways shall either :

- (i) be constructed of tight stone, dirt, sand or rubbish packing at least five yards thick ; or
  - (ii) be constructed of tight stone, dirt, sand or rubbish packing at least three yards thick, and have the end of the packing nearest the intake airway faced with a wall of masonry, brickwork or concrete not less than 9 inches thick, the face of which shall be covered with a coating of mortar so as to prevent leakage of air.
- (b) The space between the face of the stopping and the roadway shall be kept clear.
  - (c) This regulation shall apply only to mines in which coal is worked, and shall not apply to any mine in South Staffordshire which is liable to spontaneous combustion in the unworked coal.

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\* Coal Mines Act, 1911, Section 116.

See also the Order prescribing the time and manner of serving notices under that section (page 115).

*Signalling (except in sinking pits). [Section 53.]*  
*Winding.*

\* (92.) The following signals shall be used at all times in connection with winding in shafts :—

(a) For winding persons :—

- |  |   |
|--|---|
| (1) When a person is about to descend, the Banksman shall signal to the Onsetter and to the Winding Engineman .. .. .        | 3 |
| Before the person enters the cage the Onsetter shall signal to the Banksman and to the Winding Engineman .. .. .             | 3 |
| When the cage at the bottom is clear and ready to ascend, the Onsetter shall signal to the Banksman and Winding Engineman .. | 1 |
| When the person is in the cage and ready to descend, the Banksman shall signal to the Winding Engineman .. .. .              | 2 |
| (2) When a person is about to ascend, the Onsetter shall signal to the Banksman and to the Winding Engineman .. .. .         | 3 |
| Before the person enters the cage the Banksman shall signal to the Onsetter .. ..  | 3 |
| When the person is in the cage and ready to ascend, the Onsetter shall signal to the Banksman and to the Winding Engineman.. | 1 |
| When the Banksman has received the signal " 1 " from the Onsetter, he shall signal to the Winding Engineman .. .. .          | 2 |

(b) For winding otherwise than with persons :—

- |                                |   |
|--------------------------------|---|
| To raise up .. .. .            | 1 |
| To stop when in motion .. .. . | 1 |
| To lower down .. .. .          | 2 |
| To raise steadily .. .. .      | 4 |
| To lower steadily .. .. .      | 5 |

(93.) The manager shall, in the case of a mine where there are entrances into the workings from the shaft at different levels, prescribe the signals to be used to indicate the level to which the cage is to be sent, and in respect of movements of the cage between one level and another level, and shall fix any other signals that may be required.

(94.) A notice shall be posted in the engine house, and at the pit head, and at each entrance into the workings from the shaft, containing the foregoing signals and the signals fixed by the manager in pursuance of the preceding regulation.

(95.) In connection with every winding engine there shall be provided an appliance which shall automatically indicate in a

\* Paragraphs (a) (1) and (2) of this Regulation are as amended by No. 30 of the General Regulations dated July 30, 1920 (S. R. & O., 1920, No. 1423).

visible manner to the winding engineman (in addition to the ordinary signal) the nature of the signal until the signal is complied with.

(96.) No person other than the banksman or onsetter shall give any signal unless he is an official of the mine or is authorised in writing by the manager to give signals.

(97.) The foregoing regulations 92 to 95 shall not come into operation until 1st July, 1914.

### *Hauling.*

(98.) The following signals shall be used in all mines in connection with underground haulage worked by gravity or mechanical power :—

(a) Direct or Main rope Haulage :—

To stop .. .. .	1
To lower .. .. .	2
To wind up .. .. .	3

(b) Haulage (other than endless rope or chain haulage) on self-acting inclines :—

To stop .. .. .	1
To lower .. .. .	2
When persons are about to travel up or down the incline .. .. .	4
This signal shall be acknowledged by signalling ..	4

(c) Main-and-tail rope haulage :—

To stop .. .. .	1
To haul inbye .. .. .	2
To haul outbye .. .. .	3
To slack out tail-rope .. .. .	4
To tighten tail-rope .. .. .	5
To slack out main-rope .. .. .	6
To tighten main-rope .. .. .	7

(d) Endless-rope (or endless-chain) haulage :—

To commence hauling .. .. .	2
To stop hauling .. .. .	1

(99.) When persons are about to be conveyed inbye or outbye, each of the signals required by the foregoing regulations to be given when a set or train of tubs is about to be hauled inbye or outbye, as the case may be, shall be preceded by a cautionary signal of .. .. . 8

(100.) The manager shall, in the case of a mine where there are several districts, prescribe the additional signals to be used to indicate the districts; and shall fix any other signals that may be required.

(101.) A notice shall be posted in the hauling engine house and at each signalling station, containing the system of haulage signals in use at such engine house or signalling station.

(102.) The foregoing regulations 98 to 101 shall not come into operation until 1st July, 1914.

*Telephones.* [Section 54.]

(103.) Where in any mine not being a small mine\* the distance of the main haulage from the shaft exceeds 1,000 yards, efficient means of telephonic communication shall be provided and maintained between the end of the main haulage and the pit-bottom and the surface.

This regulation shall not apply to mines of stratified ironstone in the Cleveland District, or to mines in any other district as respects which the Board of Trade are satisfied that similar conditions prevail.

*Barometer and Hygrometer.* [Section 71.]

(104.) Every person on whom responsible duties are imposed with respect to the ventilation underground, and who is required to make a daily report in a book to be kept at the mine for the purpose shall, immediately before going into the mine and after coming out of the mine, read† the barometer required to be placed near the entrance to the mine. This regulation shall not apply to mines of stratified ironstone in the Cleveland District or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail.

(105.) Each hygrometer placed below ground in pursuance of the Act shall be read† by a responsible official of the mine once every weekday if in the main intake airway and once every week if in the main return airway. This regulation shall apply only to mines in which coal is worked.

*Sanitary Conveniences.* [Section 76.]

(106.) A sufficient supply of suitable sanitary conveniences shall be provided :—

- (a) On the surface, in or adjacent to the winding engine house, and at other suitable places convenient for the persons employed. Where females are employed on the surface, separate conveniences shall be provided for their use.
- (b) Below ground, at or near the pit bottom, and at suitable positions along the main roads. This provision shall not apply to a shaft in the course of being sunk.

(107.) Every sanitary convenience below ground shall have a portable receptacle constructed of metal, and provided with a metal cover.

(108.) A sufficient supply of disinfectant, or dry coal dust, or other suitable material for covering the fæces shall be constantly provided in a suitable receptacle at every convenience below

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\* “ ‘ *Small mine* ’ means a mine in which the total number of persons employed underground does not exceed thirty.” Coal Mines Act, 1911, Sec. 122.

† The readings are required by Section 71 to be entered in a book kept at the mine. The prescribed form of book is Mines and Quarries Form No. 53.



ground and at conveniences (other than water-closets) on the surface.

(109.)—(a) Every sanitary convenience on the surface shall be under cover and so partitioned off as to secure privacy, and, if for the use of females, shall have a proper door and inside fastening.

(b) Where females are employed the conveniences for each sex shall be so placed or so screened that the interior shall not be visible, even when the door of any convenience is open, from any place where persons of the other sex have to work or pass, and if the conveniences for one sex adjoin those for the other sex the approaches shall be separate.

(110.) Every sanitary convenience shall be kept in a cleanly and sanitary condition, and in good repair, and the receptacles of all conveniences below ground shall be emptied and cleaned not less frequently than once in every seven days and oftener if necessary. The receptacles shall be emptied at the surface unless satisfactory arrangements are made for disposing of the contents in the gob, goaf or waste or for their destruction in a furnace.

(111.) No person shall relieve his bowels on the surface or on any roadway below ground, except in one of the conveniences provided in accordance with the foregoing Regulations.

(112.) No person shall soil or render unfit for use in any way any convenience or sanitary utensil or appliance provided in accordance with these Regulations, and every person relieving himself below ground shall cover the faeces with disinfectant, or dry coal dust or other suitable material.

*Storage and Use of Candles and Paraffin Wax.*

(113.) Candles and paraffin wax shall not be stored in the mine below ground, except in pursuance of a written exemption by the inspector of the division, which exemption may be at any time withdrawn.

Where candles are taken below ground in proper metal boxes, each of which contains not more than one pound weight of candles, and not more than one box for each man is taken below ground, the keeping of such boxes in the working places or at a district station during a working shift shall not be deemed to be storage within the meaning of this regulation.

(114.) Where candles are stored in the mine below ground in pursuance of an exemption as aforesaid, the following conditions shall be observed :—

(a) The quantity stored on any day shall not exceed the supply reasonably required for that day ;

(b) Until required for use, they shall be kept in a box or boxes constructed of fireproof material and placed in a recess in the strata, which recess, if made in the coal, shall be lined with fireproof material. Each box shall be in the sole charge of a person specially

appointed for the purpose in writing by the Manager, and shall be kept securely locked. No person other than a person so appointed shall in any way interfere with any such box.

(115.)—(a) All candles used in the mine below ground shall be placed in a metal holder, which shall be of such design that when fixed to a prop the flame of the candle cannot set fire to the wood.

This regulation shall not apply to candles :—

- (1) When being carried ;
- (2) When used under the direct supervision of the person using the same.

(116.) Candles looped or strung together shall in no circumstances be burned off below ground.

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### PART III.—*Electricity* [Section 60.]\*

#### Below Ground.†

(117.) It shall be the duty of the mine owner, agent and manager to comply with and enforce the following regulations, and it shall be the duty of all workmen and persons employed to conduct their work in accordance with the regulations.

(118.) “ *Pressure* ” means the difference of electrical potential between any two conductors, or between a conductor and earth as read by a hot wire or electric-static volt-meter.

“ *Low Pressure* ” means a pressure in a system normally not exceeding 250 volts where the electrical energy is used.

“ *Medium Pressure* ” means a pressure in a system normally above 250 volts, but not exceeding 650 volts, where the electrical energy is used.

“ *High Pressure* ” means a pressure in a system normally above 650 volts, but not exceeding 3,000 volts, where the electrical energy is used or supplied.

“ *Extra-high Pressure* ” means a pressure in a system normally exceeding 3,000 volts, where the electrical energy is used or supplied.

“ *System* ” means an electrical system in which all the conductors and apparatus are electrically connected to a common source of electro-motive force.

“ *Concentric System* ” means a system in which the circuit in a conductor or conductors, called the inner conductor, is

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\* An explanatory memorandum on the Electricity Regulations has been issued by the Mines Department, and copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the addresses given on the title page to this volume. (Mines and Quarries Form No. 11.)

† These Regulations originally applied also to apparatus above ground which directly affected the safety of persons below ground, but *not* to other apparatus above ground. By No. 28 of the General Regulations dated July 30, 1920, however, they were applied, with certain necessary modifications, to *all* apparatus above ground. The Regulations in the form in which they apply above ground are printed on pages 27—34.

completed through one or more conductors, called the outer conductor, arranged so that the inner conductor is insulated and the outer conductor is disposed over the insulation of, and more or less completely around, the inner conductor.

“*Conductor*” means an electrical conductor arranged to be electrically connected to a system.

“*Apparatus*” means electrical apparatus, and includes all apparatus, machines and fittings in which conductors are used, or of which they form a part.

“*Circuit*” means an electrical circuit forming a system or branch of a system.

“*Covered with insulating material*” means adequately covered with insulating material of such quality and thickness that there is no danger.

“*Metallic covering*” means iron or steel armouring, with or without a lead or other metallic sheath as the conditions of the case may require, or an iron or steel pipe surrounding two or more conductors.

“*Bare*” means not covered with insulating material.

“*Live*” means electrically charged.

“*Dead*” means at, or about, zero potential, and disconnected from any live system.

“*Open Sparking*” means sparking which owing to the lack of adequate provision for preventing the ignition of inflammable gas external to apparatus would ignite such inflammable gas.

“*Earthed*” means connected to the general mass of earth in such manner as will ensure at all times an immediate discharge of electrical energy without danger.

“*Earthing system*” means an electrical system in which all the conductors are earthed.

“*Switchgear*” means switches or fuses, conductors, and other apparatus in connection therewith, used for the purpose controlling the current or pressure in any system or part of a system.

“*Authorised person*” means a person appointed in writing by the manager of the mine to carry out certain duties incidental to the generation, transformation, distribution, or use of electrical energy in the mine, such person being a person who is competent for the purposes of the rule in which the term is used.

“*Electrician*” means a person appointed in writing by the manager of the mine to supervise the apparatus in the mine and the working thereof, such person being a person who is over 21 years of age, and is competent for the purposes of the rule in which the term is used.

“*Danger*” means danger to health or danger to life or limb from shock, burn, or other injury to persons employed, or from fire or explosion attendant upon the generation, transformation, distribution, or use of electrical energy.

“*Use*” of electricity means the conversion of electricity into mechanical energy, heat, or light for the purpose of providing mechanical energy, heat, or light.

(119.) Notices shall be sent to the inspector of the division, on the forms prescribed by the Secretary of State, as follows, namely :—

- (i)\*Notice of the intention to introduce apparatus into any mine, or into any ventilating district in any mine.
- (ii)\*Notice of the intention to introduce or re-introduce electricity into any mine where the use of electricity has previously been prohibited by Section 60 (1) of the Act.
- (iii)†On or before the twenty-first day of January in every year, an annual return giving the size and type of apparatus and any particulars which may be required by the Board of Trade as to the circumstances of its use.

If the inspector of the division does not object in writing, within one calendar month from the receipt by him of the notice, to the carrying out of either of the intentions specified in the first or second notices, the owner shall be entitled to carry out such intention or intentions.

Provided that this regulation shall not apply to telephones and signalling apparatus.

(120.) A proper plan on the same scale as that kept at the mine in fulfilment of the requirements of the Act, shall be kept in the office at the mine showing the position of all fixed apparatus in the mine, other than cables, telephones and signalling apparatus. The said plan shall be corrected as often as may be necessary to keep it reasonably up to date, and it shall be produced to an inspector of mines at any time on his request.

(121.) The following Notices, constructed of durable material, shall be exhibited where necessary :—

- (i) A notice prohibiting any person other than an authorised person from handling or interfering with apparatus.
- (ii) A notice containing directions as to procedure in case of fire. This notice shall be exhibited in every place containing apparatus, other than cables, telephones and signalling apparatus.
- (iii) A notice containing directions as to the restoration of persons suffering from the effects of electric shock.
- (iv) A notice containing instructions how to communicate with the person appointed under Regulation 128 (a). This notice shall be exhibited at the shaft bottom.

(122.)—(a) In all places lighted by electricity where a failure of the electric light would be likely to cause danger, one or more safety lamps or other proper lights shall be kept continuously burning.

(b) Efficient telephonic or other equivalent means of communication shall be provided for communicating between the place

\* The prescribed form of notice is Mines and Quarries Form No. 12.

† The prescribed form of Return (Mines and Quarries Form No. 23) is sent each year to the owner from the Mines Department.

in which the switchgear provided under Regulation 128 (a) is erected and the shaft bottom or main distributing centre in the pit.

(c) Fire buckets of suitable capacity, filled with clean dry sand ready for immediate use in extinguishing fires, shall be kept in every place containing apparatus, other than cables, telephones and signalling apparatus.

(123.)—(a) Where necessary to prevent danger or mechanical damage transformers and switchgear shall be placed in a separate room, compartment, or box.

(b) Unless the apparatus is so constructed, protected, and worked as to obviate the risk of fire, no inflammable material shall be used in the construction of any room, compartment, or box containing apparatus or in the construction of any of the fittings therein. Each such room, compartment, or box shall be substantially constructed and shall be kept dry.

(c) Adequate working space and means of access clear of obstruction and free from danger shall be provided for all apparatus that has to be worked or attended to by any person, and all handles intended to be operated shall be conveniently placed for that purpose.

(124.)—(a) All apparatus and conductors shall be sufficient in size and power for the work they may be called upon to do, and so constructed, installed, protected, worked and maintained as to prevent danger so far as is reasonably practicable.

(b) All insulating material shall be chosen with special regard to the circumstances of its proposed use. It shall be of mechanical strength sufficient for its purpose, and, so far as is practicable, it shall be of such a character or so protected as fully to maintain its insulating properties under working conditions of temperature and moisture.

(c) Every part of a system shall be kept efficiently insulated from earth, except that (i) the neutral point of a polyphase system may be earthed at one point only; (ii) the mid-voltage point of any system, other than a concentric system, may be earthed at one point only; and (iii) the outer conductor of a concentric system shall be earthed. Where any point of a system is earthed it shall be earthed by connection to an earthing system at the surface of the mine.

(d) Efficient means shall be provided for indicating any defect in the insulation of a system.

(125.)—(a) All metallic sheaths, coverings, handles, joint boxes, switchgear frames, instrument covers, switch and fuse covers and boxes, and all lampholders, unless efficiently protected by an earthed or insulating covering made of fire-resisting material, and the frames and bedplates of generators, transformers and motors (including portable motors), shall be earthed by connection to an earthing system at the surface of the mine.

(b) Where the cables are provided with a metallic covering constructed and installed in accordance with Regulation 129 (e),

such metallic covering may be used as a means of connection to the earthing system. All the conductors of an earthing system shall have a conductivity at all parts and at all joints at least equal to 50 per cent. of that of the largest conductor used solely to supply the apparatus a part of which it is desired to earth. Provided that no conductor of an earthing system shall have a cross-sectional area of less than  $\cdot 022$  of a square inch.

(c) All joints in earth conductors and all joints to the metallic covering of the cables shall be properly soldered or otherwise efficiently made, and every earth conductor shall be soldered into a lug for each of its terminal connections. No switch, fuse, or circuit breaker shall be placed in any earth conductor.

This rule shall not apply (except in the case of portable apparatus) to any system in which the pressure does not exceed low pressure direct current or 125 volts alternating current.

(126.)—(a) Where electricity is distributed at a pressure higher than medium pressure (i) it shall not be used without transformation to medium or low pressure except in fixed machines in which the high or extra-high pressure parts are stationary; and (ii) motors under 20 h.p. shall be supplied with current through a transformer stepping down to medium or low pressure.

(b) Where energy is transformed, suitable provision shall be made to guard against danger by reason of the lower pressure apparatus becoming accidentally charged above its normal pressure by leakage from or contact with the higher-pressure apparatus.

(127.) Switchgear and all terminals, cable ends, cable-joints and connections of apparatus shall be constructed and installed so that—

- (i) All parts shall be of mechanical strength sufficient to resist rough usage.
- (ii) All conductors and contact areas shall be of ample current carrying capacity, and all joints in conductors shall be properly soldered or otherwise efficiently made.
- (iii) The lodgment of any matter likely to diminish the insulation, and of coal-dust on or close to live parts shall be prevented.
- (iv) All live parts shall be so protected or enclosed as to prevent accidental contact by persons and danger from arcs or short circuits, fire or water.
- (v) Where there may be risk of igniting gas, coal-dust, or other inflammable material, all parts shall be so protected as to prevent open sparking.

(128.)—(a) Properly constructed switchgear for cutting off the supply of current to the mine shall be provided at the surface of the mine, and during the time any cable is live a person authorised to operate the said switchgear shall be available within easy reach thereof.

Lightning arresters, properly adjusted and maintained, shall be provided where necessary to prevent danger.

(b) Efficient means, suitably placed, shall be provided for cutting off all pressure from every part of a system, as may be necessary to prevent danger.

\*(c) Such efficient means shall be provided in respect of each separate circuit for cutting off all pressure automatically from the circuit or part or parts of the circuit affected in the event of a fault as may be necessary to prevent danger.

(d) Every motor shall be controlled by switchgear for starting and stopping, so arranged as to cut off all pressure from the motor and from all apparatus in connection therewith, and so placed as to be easily worked by the person appointed to work the motor.

(e) If a concentric system is used no switch, fuse, or circuit breaker shall be placed in the outer conductor, or in any conductor connected thereto, except that, if required, a reversing switch may be inserted in the outer conductor at the place where the current is being used. Nevertheless, switches, fuses, or circuit breakers may be used to break the connection with the generators or transformers supplying the electricity; provided that the connection of the outer conductor with the earthing system shall not thereby be broken.

(129.) All cables, other than flexible cables for portable apparatus and signalling wires, shall comply with the following requirements :—

(a) They shall be covered with insulating material (except that the outer conductor of a concentric system may be bare). The lead sheath of lead-sheathed cables and the iron or steel armouring of armoured cables shall be of not less thickness respectively than is recommended by the Engineering Standards Committee.

(b) They shall be efficiently protected from mechanical damage and supported at sufficiently frequent intervals and in such a manner as adequately to prevent danger and damage to the cables.

(c) Concentric cables, or two-core or multi-core cables protected by a metallic covering, or single-core cables protected by a metallic covering which shall contain all the conductors of the circuit, shall be used (i) where the pressure exceeds low pressure; (ii) where the roadway conveying the cables is also used for mechanical haulage; and (iii) where there may be risk of igniting gas, coal-dust, or other inflammable material.

Provided that if the medium pressure direct current system is used (i) two single-core cables protected by metallic coverings may be used for any circuit if the said metallic coverings are

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\* As amended by No. 33 of the General Regulations dated July 30, 1920 (S.R. & O., 1920, No. 1423).

bonded together by earth conductors so placed that the distance between any two consecutive bonds is not greater than 100 feet measured along either cable, and (ii) two single-core cables covered with insulating material efficiently protected otherwise than by a metallic covering may be used in gate roads (except in gate roads which are also used for mechanical haulage, or where there may be risk of igniting gas, coal-dust, or other inflammable material) for the purpose of supplying portable apparatus.

(d) Cables unprotected by a metallic covering shall be properly secured by some non-conducting and readily breakable material to efficient insulators.

(e) The metallic covering of every cable shall be (i) electrically continuous throughout ; (ii) earthed, if it is required by Regulation 125 (a) to be earthed, by a connection to the earthing system of not less conductivity than the same length of the said metallic covering ; (iii) efficiently protected against corrosion where necessary ; (iv) of a conductivity at all parts and at all joints at least equal to 50 per cent. of the conductivity of the largest conductor enclosed by the said metallic covering ; and (v) where there may be risk of igniting gas, coal-dust, or other inflammable material, so constructed as to prevent as far as is practicable any fault or leakage of current from the live conductors from causing open sparking.

Provided that where two single-core cables protected by metallic coverings bonded together in accordance with paragraph (c) of this regulation are used for a circuit, the conductivity of each of the said metallic coverings at all parts and at all joints shall be at least equal to 25 per cent. of the conductivity of the conductor enclosed thereby.

(f) Cables and conductors, where joined up to motors, transformers, switchgear and other apparatus, shall be installed so that (i) they are mechanically protected by securely attaching the metallic covering (if any) to the apparatus ; and (ii) the insulating material at each cable end is efficiently sealed so as prevent the diminution of its insulating properties. Where necessary to prevent abrasion or to secure gas-tightness there shall be properly constructed bushes.

(130.)—(a) Flexible cables for portable apparatus shall be two-core or multi-core and covered with insulating material which shall be efficiently protected from mechanical damage. If a flexible metallic covering be used either as the outer conductor of a concentric system or as a means of protection from mechanical damage the same shall not alone be used to form an earth conductor for the portable apparatus.

(b) Every flexible cable for portable apparatus shall be connected to the system and to the portable apparatus itself by a properly constructed connector.

(c) At every point where flexible cables are joined to main cables a switch capable of entirely cutting off the pressure from the flexible cables shall be provided.



(d) No lampholder shall be in a metallic connection with the guard or other metal work of a portable lamp.

(131.)—(a) Every person appointed to work, supervise, examine, or adjust any apparatus shall be competent for the work that he is set to do. No person except an electrician or a competent person acting under his supervision shall undertake any work where technical knowledge or experience is required in order adequately to avoid danger.

(b) An electrician shall be appointed in writing by the manager to supervise the apparatus. If necessary for the proper fulfilment of the duties detailed in the succeeding paragraphs of this rule, the manager shall also appoint in writing an assistant or assistants to the electrician.

(c) The electrician shall be in daily attendance at the mine. He shall be responsible for the fulfilment of the following duties, which shall be carried out by him or by an assistant or assistants duly appointed under paragraph (b) : (i) the thorough examination of all apparatus (including the testing of earth conductors and metallic coverings for continuity) as often as may be necessary to prevent danger ; and (ii) the examination and testing of all new apparatus, and of all apparatus re-erected in a new position in the mine before it is put into service in the new position.

Provided that in the absence of the electrician for more than one day the manager shall appoint in writing an efficient substitute.

(d) The electrician shall keep at the mine a log-book made up of daily log-sheets kept in the form prescribed by the Board of Trade.\* The said log-book shall be produced at any time to an inspector of mines on his request.

(e) Should there be a fault in any circuit the part affected shall be made dead without delay, and shall remain so until the fault has been remedied.

(f) All apparatus shall be kept clear of obstruction and free from dust, dirt and moisture, as may be necessary to prevent danger.

Inflammable or explosive material shall not be stored in any room, compartment, or box containing apparatus, or in the vicinity of apparatus.

(g) Adequate precautions shall be taken by earthing or other suitable means to discharge electrically any conductor or apparatus, or any adjacent apparatus if there is danger therefrom, before it is handled, and to prevent any conductor or apparatus from being accidentally or inadvertently electrically charged when persons are working thereon. While lamps are being changed the pressure shall be cut off.

Provided that this paragraph shall not apply to the cleaning of commutators and slip-rings working at low or medium pressures.

(h) The person authorised to work an electrically driven coal-cutter or other portable machine shall not leave the machine

\* The prescribed form of log-book is Mines and Quarries Form No. 10.

while it is working, and shall, before leaving the working place, ensure that the pressure is cut off from the flexible trailing cable which supplies such coal-cutter or other portable machine. Trailing cables shall not be dragged along by the machine when working.

(i) Every flexible cable shall be examined periodically (if used with a portable machine, at least once in each shift by the person authorised to work the machine), and if found damaged or defective it shall forthwith be replaced by a spare cable in good and substantial repair. Such damaged or defective cable shall not be further used underground until after it has been sent to the surface and there properly repaired.

(132.) In any part of a mine in which inflammable gas, although not normally present, is likely to occur in quantity sufficient to be indicative of danger, the following additional requirements shall be observed :—

- (i) All cables, apparatus, signalling wires and signalling instruments shall be constructed, installed, protected, worked and maintained, so that in the normal working thereof there shall be no risk of open sparking.
- (ii) All motors shall be constructed so that when any part is live all rubbing contacts (such as commutators and slip-rings) are so arranged or enclosed as to prevent open sparking.
- (iii) The pressure shall be switched off apparatus forthwith if open sparking occurs, and during the whole time that examination or adjustment disclosing parts liable to open sparking is being made. The pressure shall not be switched on again until the apparatus has been examined by the electrician or one of his duly appointed assistants and the defect (if any) has been remedied or the adjustment made.
- (iv) Every electric lamp shall be enclosed in an airtight fitting, and the lamp globe itself shall be hermetically sealed.
- (v) A safety lamp shall be provided and used with each motor when working, and should any indication of fire-damp appear from such safety lamp, the person appointed to work the motor shall forthwith cut off the pressure therefrom and report the matter to a fireman, examiner, or deputy or other official.

(133.)—(a) Current from lighting or power circuits shall not be used for firing shots.

(b) Shot-firing cables shall be covered and protected as provided by Regulation 130 (a) for flexible cables. Adequate precautions shall be taken to prevent them from touching other cables and apparatus.

(134.)—(a) Where electricity is used for signalling the pressure in any one circuit shall not exceed 25 volts.

(b) Contact-makers shall be so constructed as to prevent the accidental closing of the circuit.

(c) Adequate precautions shall be taken to prevent signal and telephone wires from touching cables and other apparatus.

\*(135.)—(a) All relighting apparatus shall be so constructed, worked and maintained as to preclude the accumulation of explosive gas within it.

(b) Relighting apparatus shall not be used in any part of a mine to which Regulation 132 applies.

(c) All safety lamps when relighted shall be examined before being issued.

(136.)—(a) Haulage by electric locomotives on the overhead trolley wire system is prohibited in any mine in which coal is worked.

(b) Haulage by electric locomotives on the overhead trolley wire system may be used in mines other than coal mines, and haulage by storage battery locomotives may be used in any mine, with the consent in writing first obtained of the Board of Trade in all cases, and subject to such conditions affecting safety as may be prescribed by them.

(137.)—(a) Any of the requirements of this Part of these Regulations shall not apply in any case in which exemption is obtained from the Board of Trade on the ground either of emergency or special circumstances, on such conditions as the Board of Trade may prescribe.

(b) The requirements of this Part of these Regulations which relate to the construction of cables and other apparatus shall not before the 1st day of January, 1920, apply to any apparatus which was in use before the 1st day of June, 1911, and which had been constructed or had before the 1st day of June, 1911, been adapted so as to comply with the requirements relating to the construction of electrical apparatus in mines in force before that date, unless the inspector of the division, by written notice served on the owner, agent or manager as regards either all or any of the said requirements of the foregoing rules, so directs. If the owner, agent, or manager within 14 days after the receipt of such notice objects to comply with the requirements specified in the notice, the matter shall be settled in manner provided by the Act for settling disputes.†

#### ‡ Above Ground.

(117.) It shall be the duty of the mine owner, agent, and manager to comply with and enforce the following regulations, and it shall be the duty of all workmen and persons employed to conduct their work in accordance with the regulations.

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\* See also the Order of October 24, 1912, as to the use underground of apparatus for the relighting electrically of safety lamps (page 110).

† Coal Mines Act, 1911, Section 116. See also the Order prescribing the time and manner of serving notices under that section (page 115).

‡ These Regulations have been numbered so as to correspond with those applying below ground. See footnote on page 18.

(118.) "*Pressure*" means the difference of electrical potential between any two conductors, or between a conductor and earth as read by a hot wire or electro-static volt-meter.

"*Low pressure*" means a pressure in a system normally not exceeding 250 volts where the electrical energy is used.

"*Medium pressure*" means a pressure in a system normally above 250 volts, but not exceeding 650 volts, where the electrical energy is used.

"*High pressure*" means a pressure in a system normally above 650 volts, but not exceeding 3,000 volts, where the electrical energy is used or supplied.

"*Extra-high pressure*" means a pressure in a system normally exceeding 3,000 volts, where the electrical energy is used or supplied.

"*System*" means an electrical system in which all the conductors and apparatus are electrically connected to a common source of electro-motive force.

"*Concentric system*" means a system in which the circuit in a conductor or conductors, called the inner conductor, is completed through one or more conductors, called the outer conductor, arranged so that the inner conductor is insulated, and the outer conductor is disposed over the insulation of, and more or less completely around, the inner conductor.

"*Conductor*" means an electrical conductor arranged to be electrically connected to a system.

"*Apparatus*" means electrical apparatus, and includes all apparatus, machines, and fittings in which conductors are used, or of which they form a part.

"*Circuit*" means an electrical circuit forming a system or branch of a system.

"*Covered with insulating material*" means adequately covered with insulating material of such quality and thickness that there is no danger.

"*Metallic covering*" means iron or steel armouring, with or without a lead or other metallic sheath as the conditions of the case may require, or an iron or steel pipe surrounding two or more conductors.

"*Bare*" means not covered with insulating material.

"*Live*" means electrically charged.

"*Dead*" means at, or about, zero potential, and disconnected from any live system.

"*Open sparking*" means sparking which owing to the lack of adequate provisions for preventing the ignition of inflammable gas external to apparatus would ignite such inflammable gas.

"*Earthed*" means connected to the general mass of earth in such manner as will ensure at all times an immediate discharge of electrical energy without danger.

"*Earthing system*" means an electrical system in which all the conductors are earthed.

“ *Switchgear* ” means switches or fuses, conductors, and other apparatus in connection therewith, used for the purpose of controlling the current or pressure in any system or part of a system.

“ *Authorised person* ” means a person appointed in writing by the manager of the mine to carry out certain duties incidental to the generation, transformation, distribution or use of electrical energy at the surface of the mine, such person being a person who is competent for the purposes of the regulation in which the term is used.

“ *Electrician* ” means a person appointed in writing by the manager of the mine to supervise the apparatus at the surface of the mine and the working thereof, such person being a person who is over 21 years of age, and is competent for the purposes of the regulation in which the term is used.

“ *Danger* ” means danger to health or danger to life or limb from shock, burn, or other injury to persons employed, or from fire or explosion attendant upon the generation, transformation, distribution, or use of electrical energy.

“ *Use* ” of electricity means the conversion of electricity into mechanical energy, heat, or light for the purpose of providing mechanical energy, heat, or light.

(121.) The following Notices, constructed of durable material, shall be exhibited where necessary :—

- (i) A notice prohibiting any person other than an authorised person from handling or interfering with apparatus.
- (ii) A notice containing directions as to procedure in case of fire. This notice shall be exhibited in every place containing apparatus, other than cables, telephones and signalling apparatus.
- (iii) A notice containing directions as to the restoration of persons suffering from the effects of electric shock.

(122.)—(a) In all places lighted by electricity where a failure of the electric light would be likely to cause danger, one or more safety lamps or other proper lights shall be kept continuously burning.

(c) Fire buckets of suitable capacity, filled with clean dry sand ready for immediate use in extinguishing fires, shall be kept in every place containing apparatus, other than cables, telephones and signalling apparatus.

(123.)—(a) Where necessary to prevent danger or mechanical damage, apparatus shall be placed in a separate room, compartment or box of fireproof construction. Inflammable or explosive material shall not be stored in any such room, compartment or box.

(c) Adequate working space and means of access clear of obstruction and free from danger shall be provided for all apparatus that has to be worked or attended to by any person, and all handles intended to be operated shall be conveniently placed for that purpose.

(124.)—(a) All apparatus and conductors shall be sufficient in

size and power for the work they may be called upon to do, and so constructed, installed, protected, worked and maintained as to prevent danger so far as is reasonably practicable.

(b) All insulating material shall be chosen with special regard to the circumstances of its proposed use. It shall be of mechanical strength sufficient for its purpose, and so far as is practicable, it shall be of such a character or so protected as fully to maintain its insulating properties under working conditions of temperature and moisture.

(c) Every part of a system, shall be kept efficiently insulated from earth, except that (i) the neutral point of a polyphase system may be earthed at one point only; (ii) the mid-voltage point of any system, other than a concentric system, may be earthed at one point only; and (iii) the outer conductor of a concentric system shall be earthed. Where any point of a system is earthed it shall be earthed by connection to an earthing system at the surface of the mine.

(d) Efficient means shall be provided for indicating any defect in the insulation of a system.

(125.)—(a) All metallic sheaths, coverings, handles, joint-boxes, switchgear frames, instrument covers, switch and fuse covers and boxes, and all lampholders, unless efficiently protected by an earthed or insulating covering made of fire-resisting material, and the frames and bedplates of generators, transformers, and motors (including portable motors), shall be earthed by connection to an earthing system at the surface of the mine.

(b) Where the cables are provided with a metallic covering constructed and installed in accordance with Regulation 129 (e), such metallic covering may be used as a means of connection to the earthing system. All the conductors of an earthing system shall have a conductivity at all parts and at all joints at least equal to 50 per cent. of that of the largest conductor used solely to supply the apparatus a part of which it is desired to earth. Provided that no conductor of an earthing system shall have a cross-sectional area of less than  $\cdot 022$  of a square inch.

Except that in the case of a portable lamp or other portable apparatus of small current capacity, connected to the system by means of a flexible cable complying with Regulation 130, the cross-sectional area of the earthing conductor in the flexible cable shall not be required to be greater than the cross-sectional area of either of the live conductors in the same flexible cable.

(c) All joints in earth conductors and all joints to the metallic covering of the cables shall be properly soldered or otherwise efficiently made, and every earth conductor shall be soldered into a lug for each of its terminal connections. No switch, fuse or circuit breaker shall be placed in any earth conductor.

This regulation shall not apply (except in the case of portable apparatus) to any system in which the pressure does not exceed low pressure direct current or 125 volts alternating current.

(126.)—(a) Where electricity is distributed at a pressure higher than medium pressure, (i) it shall not be used without transformation to medium or low pressure except in fixed machines in which the high or extra-high pressure parts are stationary; and (ii) motors under 20 h.p. shall be supplied with current through a transformer stepping down to medium or low pressure.

(b) Where energy is transformed suitable provision shall be made to guard against danger by reason of the lower pressure apparatus becoming accidentally charged above its normal pressure by leakage from or contact with the higher pressure apparatus.

(127.) Switchgear and all terminals, cable ends, cable joints and connections of apparatus shall be constructed and installed so that—

- (i) All parts shall be of mechanical strength sufficient to resist rough usage.
- (ii) All conductors and contact areas shall be of ample current carrying capacity and all joints in conductors shall be properly soldered or otherwise efficiently made.
- (iii) The lodgment of any matter likely to diminish the insulation, and of coal-dust on or close to live parts shall be prevented.
- (iv) All live parts shall be so protected or enclosed as to prevent accidental contact by persons and danger from arcs or short circuits, fire or water.
- (v) Where there may be risk of igniting gas, coal-dust, or other inflammable material, all parts shall be so protected as to prevent open sparking.

(128.)—(b) Efficient means, suitably placed, shall be provided for cutting off all pressure from every part of a system, as may be necessary to prevent danger.

\*(c) Such efficient means shall be provided in respect of each separate circuit for cutting off all pressure automatically from the circuit or part or parts of the circuit affected in the event of a fault as may be necessary to prevent danger.

(d) Every motor shall be controlled by switchgear for starting and stopping, so arranged as to cut off all pressure from the motor and from all apparatus in connection therewith, and so placed as to be easily worked by the person appointed to work the motor.

(e) If a concentric system is used no switch, fuse, or circuit breaker shall be placed in the outer conductor, or in any conductor connected thereto, except that, if required, a reversing switch may be inserted in the outer conductor at the place where the current is being used. Nevertheless, switches, fuses, or

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\* As amended by No. 33 of the General Regulations dated July 30, 1920 (S. R. & O., 1920, No. 1423).

circuit breakers may be used to break the connection with the generators or transformers supplying the electricity; provided that the connection of the outer conductor with the earthing system shall not thereby be broken.

(129.) Unless so placed or otherwise safeguarded as to prevent danger, all cables other than flexible cables for portable apparatus and signal and telephone wires shall comply with the following requirements :—

(a) They shall be covered with insulating material (except that the outer conductor of a concentric system may be bare). The lead sheath of lead-sheathed cables and the iron or steel armouring of armoured cables shall be of not less thickness respectively than is recommended by the British Engineering Standards Association.

(b) They shall be efficiently protected from mechanical damage and supported at sufficiently frequent intervals and in such a manner as adequately to prevent danger and damage to the cables.

(c) Concentric cables, or two-core or multi-core cables protected by a metallic covering, or single-core cables protected by a metallic covering which shall contain all the conductors of the circuit, shall be used (i) where the pressure exceeds low pressure, and (ii) where there may be risk of igniting coal-dust or other inflammable material. Provided that if the medium pressure direct current system is used two single core cables protected by metallic coverings may be used for any circuit.

(d) Cables unprotected by a metallic covering shall be properly secured to efficient insulators.

(e) The metallic covering of every cable shall be (i) electrically continuous throughout; (ii) earthed, if it is required by Regulation 125 (a) to be earthed, by a connection to the earthing system of not less conductivity than the same length of the said metallic covering; (iii) efficiently protected against corrosion where necessary; (iv) of a conductivity at all parts and at all joints at least equal to 50 per cent. of the conductivity of the largest conductor enclosed by the said metallic covering; and (v) where there may be risk of igniting coal-dust or other inflammable material, so constructed as to prevent, as far as is practicable, any fault or leakage of current from the live conductors from causing open sparking.

(f) Cables and conductors, where joined up to motors, transformers, switchgear, and other apparatus, shall be installed so that (i) they are mechanically protected by securely attaching the metallic covering (if any) to the apparatus; and (ii) the insulating material at each cable end is efficiently sealed so as to prevent the diminution of its insulating properties. Where necessary to prevent abrasion there shall be properly constructed bushes.



(130.)—(a) Flexible cables for portable apparatus shall be two-core or multi-core and covered with insulating material which shall be efficiently protected from mechanical damage. If a flexible metallic covering be used either as the outer conductor of a concentric system or as a means of protection from mechanical damage the same shall not alone be used to form an earth conductor for the portable apparatus.

(b) Every flexible cable for portable apparatus shall be connected to the system and to the portable apparatus itself by a properly constructed connector.

(c) At every point where flexible cables for portable apparatus are joined to main cables a switch capable of entirely cutting off the pressure from the flexible cables shall be provided.

(d) No lampholder shall be in metallic connection with the guard or other metal work of a portable lamp.

(131.)—(a) Every person appointed to work, supervise, examine, or adjust any apparatus shall be competent for the work that he is set to do. No person except an electrician or a competent person acting under his supervision shall undertake any work where technical knowledge or experience is required in order adequately to avoid danger.

(b) An electrician shall be appointed in writing by the manager to supervise the apparatus. If necessary for the proper fulfilment of the duties detailed in the succeeding paragraphs of this Regulation, the manager shall also appoint in writing an assistant or assistants to the electrician.

(c) The electrician shall be in daily attendance at the mine. He shall be responsible for the fulfilment of the following duties, which shall be carried out by him or by an assistant or assistants duly appointed under paragraph (b) : (i) the thorough examination of all apparatus (including the testing of earth conductors and metallic coverings for continuity) as often as may be necessary to prevent danger ; and (ii) the examination and testing of all new apparatus, and of all apparatus re-erected in a new position at the surface of the mine before it is put into service in the new position.

Provided that in the absence of the electrician for more than one day the manager shall appoint, in writing, an efficient substitute.

(d) The electrician shall keep at the mine a log-book made up of daily log-sheets kept in the form prescribed by the Board of Trade.\* The said log-book shall be produced at any time to an Inspector of Mines on his request.

(e) Should there be a fault in any circuit, the part affected shall be made dead without delay, and shall remain so until the fault has been remedied.

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\* The prescribed form of log-book is Mines and Quarries Form No. 10.

(f) All apparatus shall be kept clear of obstruction and free from dust, dirt and moisture, as may be necessary to prevent danger.

(g) Adequate precautions shall be taken by earthing or other suitable means to discharge electrically any conductor or apparatus, or any adjacent apparatus, if there is danger therefrom, before it is handled, and to prevent any conductor or apparatus from being accidentally or inadvertently electrically charged when persons are working thereon. While lamps are being changed the pressure shall be cut off.

Provided that this paragraph shall not apply to the cleaning of commutators and slip rings working at low or medium pressures.

(h) The person authorised to work an electrically driven portable machine shall not leave the machine while it is working, and shall, before leaving the machine, ensure that the pressure is cut off from the flexible trailing cable which supplies such portable machine. Trailing cables shall not be dragged along by the machine when working.

(i) Every flexible cable shall be examined periodically (if used with a portable machine, at least once in each shift by the person authorised to work the machine), and if found damaged or defective it shall forthwith be repaired or replaced by a spare cable in good and substantial repair.

(134.)—(b) Contact-makers used for signalling shall be so constructed as to prevent the accidental closing of the circuit.

(c) Adequate precautions shall be taken to prevent signal and telephone wires from touching cables and other apparatus.

(137.)—(a) Any of the requirements of this part of these Regulations shall not apply in any case in which exemption is obtained from the Board of Trade on the ground either of emergency or special circumstances, on such conditions as the Board of Trade may prescribe.

#### \*PART IV.—*Rescue and Ambulance* [Section 85].

##### (a) *Rescue.*

(138.) The following Regulations shall apply to all mines in which coal is worked,† provided, however, that the Board of Trade may, if they think fit, exempt from the Regulations any mine

\* See also General Regulations dated May 19, 1914, page 49; and Part III of General Regulations dated July 30, 1920, page 58.

† The Regulations were extended to oil shale mines from January 1, 1921. See No. 27 of the Regulations dated July 30, 1920, page 61.

at which the total number of underground employees is less than 100 if the mine is so situated that in the opinion of the Board of Trade the organisation of a Central Rescue Station from which it could be served is impracticable.

(139.) No person, unless authorised by the manager or official appointed by the manager for the purpose, or, in the absence of the manager or such official, by the principal official of the mine present at the surface, shall be allowed to enter a mine after an explosion of fire-damp or coal-dust, or after the occurrence of a fire, for the purpose of engaging in rescue work.

(140.)—(a) There shall be organised and maintained at every mine, as soon as is reasonably practicable, \* competent rescue brigades on the following scale :—

Where the number of underground employees is 250 or less .. .. .	1 brigade.
Where the number of underground employees is more than 250 but not more than 700 .. .. .	2 brigades.
Where the number of underground employees is more than 700 but not more than 1,000 .. .. .	3 brigades.
Where the number of underground employees is more than 1,000 .. .. .	4 brigades.

But the owner, agent or manager of a mine, at which the total number of underground employees is less than 100, shall be deemed to have complied with this provision if he has acquired the privilege of calling for a brigade from a Central Rescue Station.

A group of mines belonging to the same owner, of which all the shafts or exits for the time being in use in working the mines lie within a circle having a radius of two miles, shall, for the purpose of ascertaining the number of brigades required, be treated as one mine.

(b) A rescue brigade shall consist of not less than five persons employed at the mine, carefully selected on account of their knowledge of underground work, coolness and powers of endurance, and certified to be medically fit, a majority of whom shall be trained in First Aid and shall hold a Certificate of the St. John Ambulance Association or the St. Andrew's Association or other society or body approved by the Board of Trade.

(c) There shall be selected from the ranks of each rescue brigade one person or leader who shall act as captain of the brigade.

(d) A brigade shall not be deemed competent unless (i) it undergoes a course of training approved by the Board of Trade\* ; (ii) after the preliminary course of training it undergoes in every quarter at least one day's practice with breathing apparatus, which practice shall at least twice in the year take place at the mine ; (iii) the members of the brigade shall have received

\* For approved Scheme of training *see* Appendix VI, p. 148.

instruction in the reading of mine plans, in the use and construction of breathing apparatus, in the properties and detection of poisonous or inflammable gases, and in the various appliances used in connection with mine rescue and recovery work.

(e) Arrangements shall be made at every mine for summoning members of rescue brigades immediately their services are required.

(141.) If it can clearly be proved that the necessary number of persons employed underground at a mine will not consent to form a brigade or brigades, or having offered their services fail to be trained or maintain their training, the owner, agent or manager of the mine shall not be liable to any penalty provided, first, that he has endeavoured to the best of his ability to constitute the requisite brigade or brigades, and has afforded every opportunity to the persons employed at the mine to undergo the necessary training, and, secondly, that he has made a *bonâ fide* attempt to arrange for the supply from a Central Rescue Station of such rescue brigades as he is unable to provide at his mine.

(142.)—(a) There shall be provided and maintained at every mine suits of portable breathing apparatus in the proportion of two suits to each brigade required by Regulation 140 (a). The apparatus must be capable of enabling the wearer to remain for at least one hour in an irrespirable atmosphere, and must be kept ready for immediate use. The apparatus must be housed in suitable receptacles in a dry and cool room.

The owner, agent or manager of a mine shall be deemed to have complied with this requirement if he has acquired the privilege of calling for such of these appliances as he may not possess from a Central Rescue Station, always provided that the Central Rescue Station is situated within a radius of 10 miles from the mine and is in telephonic communication with the mine.

(b) There shall be kept at every mine tracings\* of the workings of the mine up to a date not more than three months previously, showing the ventilation and all principal doors, stoppings and air crossings, regulators and telephone stations, and distinguishing the intake air by a different colour from the return air, which tracings shall be in a suitable form for use by the brigades.

(c) There shall also be provided and maintained at every mine which maintains a rescue brigade or brigades—

- (i) Two or more small birds or mice for testing for carbon monoxide.
- (ii) Two electric hand-lamps for each brigade, ready for immediate use and capable of giving light for at least four hours.
- (iii) One oxygen reviving apparatus.

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\* For signs to be used in mine tracings, see No. 21 of and First Schedule to the General Regulations dated July 30, 1920, pages 60-61.

(iv) A safety lamp for each member of the rescue brigades for testing for fire-damp.

(v) An ambulance box provided by the St. John Ambulance Association or similar box, together with antiseptic solution and fresh drinking water.

(143.) There shall be kept and maintained in every Central Rescue Station not less than 15 complete suits of breathing apparatus, with means of supplying sufficient oxygen or liquid air to enable such apparatus to be constantly used for two days, and of charging such apparatus ; and

20 electric hand-lamps ;

4 oxygen reviving apparatus ;

An ambulance box or boxes, provided by the St. John Ambulance Association, or similar boxes, together with antiseptic solution and fresh drinking water ;

Cages of birds.

A motor car shall be kept in constant readiness.

(144.) Every Central Rescue Station shall be placed under the immediate control of a competent person conversant with the use of the appliances.

(145.) There shall be adopted at every mine by the owner, agent or manager such Rules for the conduct and guidance of persons employed in rescue work in or about the mine as may appear best calculated for the carrying out of rescue operations, and the rescue brigade or brigades, if any, maintained at the mine shall be thoroughly instructed in such rules.

(146.) " Central Rescue Station " means a station established to serve several collieries.

(b) *Ambulance.*

(147.) In every mine there shall be provided and kept in good condition and ready for immediate use at a convenient spot in the district of each fireman, examiner, or deputy, and also in the office at the mine or other convenient place on the surface :—

(a) A suitably constructed stretcher.

(b) A box containing a sufficient supply of suitable splints and bandages, adhesive plaster, boric, vaseline, cotton-wool and tincture of iodine or other suitable anti-septic solution.

Adjoining districts may for the purpose of this Regulation be treated as one district, if the total number of persons employed in those districts at any one time does not exceed 50.

The foregoing requirements shall not apply to any mine, seam, or district the conditions of which are so damp as to make it impossible to keep the appliances aforesaid in a good state.

In case of dispute between the manager and the workmen as to the possibility of keeping ambulance appliances in a good state.

the matter shall be referred to the Inspector of the Division, who shall have power to decide the dispute.

The manager or other qualified official appointed by him shall personally inspect the appliances so provided, at least once in every month, and satisfy himself that they are in conformity with the above requirements.

(148.) In every mine, not being a small mine,\* the manager shall arrange, if possible, that there shall be at least one man trained in first aid and holding a certificate of the St. John Ambulance Association, the St. Andrew's Association, or other Society or body approved by the Board of Trade,† in the district of each fireman, examiner or deputy at any time when twenty persons or more are being employed in the district. If less than twenty persons are employed in each district the manager shall arrange if possible that there shall be below ground during each shift at least one man so trained and having the certificate as aforesaid. This regulation shall not come into force until 1st April, 1914.

(149.) There shall be provided and kept in good condition at every mine a suitably constructed ambulance carriage. This requirement shall not apply—

- (a) To any mine at which the total number of employees is less than 100 if the mine is so situated that in the opinion of the Board of Trade it cannot be served from a Central Rescue Station, hospital, or other place, or by an arrangement with other mines for the joint provision of a carriage as hereinafter provided and if the mine is exempted by the Board of Trade.
- (b) To any mine at which the total number of employees is less than 500, if the owner, agent or manager has acquired the privilege of obtaining the use of such a conveyance when required from a Central Rescue Station, hospital or other place, distant not more than 10 miles from the mine, and in telephonic communication with the mine.
- (c) To any mine at which the total number of employees is 500 or more, if the owner, agent or manager has acquired the privilege of obtaining the use of a suitably constructed motor ambulance carriage when required from a Central Rescue Station, hospital or other place distant not more than 10 miles from the mine, and in telephonic communication with the mine and the Inspector of the Division is satisfied that the arrangements are such as to ensure the prompt attendance of the carriage at the mine.

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\* "' Small mine ' means a mine in which the total number of persons employed underground does not exceed thirty." Coal Mines Act, 1911, Sec. 122.

† For list of Approved Societies see Appendix V, page 151.

A group of mines belonging to the same owner or to owners who have entered into an arrangement for the joint provision of an ambulance carriage shall for the purpose of this regulation be treated as one mine, if all the shafts or exits for the time being in use in working the mines lie within a circle having a radius of not more than two miles, or where a motor ambulance carriage is provided in constant readiness and facilities exist at each mine for summoning the carriage by telephone, five miles.

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**PART V.**—*Surface Lines and Sidings.*

The following regulations shall apply to lines of rails of not less than 4 feet 8½ inches gauge and sidings, including lines or sidings to which Section 111 of the Act applies,\* and the use of locomotives and wagons thereon :—

(150.) Point rods and signal wires in such a position as to be a source of danger to persons employed shall be sufficiently covered or otherwise guarded.

(151.) Ground levers working points shall be so placed that men working them are clear of adjacent lines, and shall be placed in a position parallel to the adjacent lines, or in such other position and be of such form as to cause as little obstruction as possible to persons employed.

This rule shall only apply to sidings constructed after 10th June, 1911.

(152.) Lines of rails and points shall be periodically examined and kept in efficient order, having regard to the nature of the traffic.

(153.) Coupling poles or other suitable mechanical appliances shall be provided where required, and shall be used in every case for coupling and uncoupling locomotives or wagons in motion wherever it is reasonably practicable.

(154.) Pointed wood sprags, not exceeding three feet in length, and scotches, when required, shall be provided for the use of persons in charge of the movement of wagons, and shall be used as and when required.

(155.) No person, except those in charge of the wagons, shall pass immediately in front of or between wagons moving under the screens.

(156.) Where during the period between one hour after sunset and one hour before sunrise, or in foggy weather, shunting or any operations likely to cause danger to persons employed are frequently carried on, efficient lighting shall be provided either by hand lamps or stationary lights, as the case may require, at all points where necessary for the safety of such persons.

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\* Section 111 of the Act applies to any line or siding used in connection with a mine and not being part of a railway within the meaning of the Railway Employment (Prevention of Accidents) Act, 1900, *i.e.*, not being part of a railway used for the purposes of public traffic.

(157.) When materials are placed within three feet of a line of rails and persons employed are exposed to risk of injury from traffic by having to pass on foot over them or between them and the line, such material shall, as far as reasonably practicable, be so placed as not to endanger such persons, and there shall be adequate recesses at intervals of not more than twenty yards where the materials exceed that length.

This rule shall not apply to stocking grounds.

(158.) No person shall cross a line of rails by crawling or passing underneath a train or wagons thereon where there may be risk of danger from traffic.

(159.) Wagons shall not be moved or allowed to be moved on a line of rails by means of a prop or pole when other reasonably practicable means may be adopted. Props used for the above purpose shall be made of iron, steel, or strong timber hooped with iron to prevent splitting, and ropes or chains used for towing shall be of a suitable nature and sufficient strength.

(160.) Wherever railway wagons are specially placed so as to afford a thoroughfare, such thoroughfare shall be at least five yards in length.

(161.) Where a locomotive pushes more than one wagon and risk of injury may thereby be caused to persons employed, a man shall, wherever it is safe and reasonably practicable, accompany or precede the front wagon, or other efficient means shall be taken to obviate such risk.

(162.)—(a) No person shall be upon the buffer of a locomotive or wagon in motion unless there is a secure handhold, and shall not stand thereon unless there is also a secure footplace; (b) no person shall ride on a locomotive or wagon by means of a coupling pole or other like appliance.

(Paragraph (a) of this rule shall not come into operation until 10th June, 1916.)

(163.) No locomotive or wagon shall be moved on a line of rails until warning has been given by the person in charge to persons employed whose safety is likely to be endangered.

(164.) Where persons employed have to pass on foot or work, no locomotive or wagon shall be moved on a line of rails during the period between one hour after sunset and one hour before sunrise, or in foggy weather, unless the approaching end, wherever it is safe and reasonably practicable, is distinguished by a suitable light or accompanied by a man with a lamp.

Provided that this regulation shall not apply to the movement of locomotives or wagons within any area which is efficiently lighted by stationary lights.

(165.) Any person who has been holding a pair of points must see that they drop back into their proper position before leaving them; and in case of throw-over point levers he must see that the lever is thrown back into its proper position before leaving it,



(166.) Where wagons are used on self-acting inclined planes efficient stop-blocks shall be provided at the top of the inclines, and runaway switches shall be fixed in such position as to prevent danger, and no wagon shall be left on a self-acting incline without being properly secured.

(167.) The driver in charge of a locomotive or a man preceding it on foot shall give an efficient sound signal as a warning on approaching any level crossing over a line of rails regularly used by persons employed, or any curve where sight is intercepted, or any other point of danger to persons employed.

(168.) A danger signal shall be exhibited at or near the ends of any wagon or train of wagons undergoing repair wherever persons employed are liable to be endangered by an approaching locomotive or wagon.

(169.) No person under the age of 18 shall be employed as a locomotive driver, and no person under the age of 16 shall be employed as a shunter.

(170.) All glass tubes of water gauges on locomotives or stationary boilers used for the movement of wagons shall be adequately protected by a covering or guard.

(171.) No person shall move or attempt to move a wagon by pushing at the buffer.

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#### PART VI.—*Additional Regulations for Sinking.*

For the purpose of the regulations, kibble includes kettle, hoppet, tub, bowk, barrel or cage.

(172.) In addition to the daily examination required by Section 66 of the Act, the master sinker, or a competent person appointed for the purpose by the manager, shall once at least in every twenty-four hours examine thoroughly the state of the shaft and the state of all gear by which cradles, platforms, or pumps are slung in the shaft or by which persons or materials are raised or lowered.

(173.)—(a) The manager shall fix by a notice which shall be kept posted at the top of the shaft in a prominent position the number of persons who may ride in the kibble at one time, and the banksman or chargeman, as the case may be, shall not allow any person to ride in excess of that number.

(b) No person shall ride on or against a full kibble or on the edge of a kibble.

(174.) No engine worked by mechanical power other than a fixed engine shall be used for lowering and raising persons and material in the shaft.

(175.) Every cradle or platform used in the shaft shall be constructed with a grid or other suitable contrivance, when necessary to secure the efficient ventilation of the whole of the shaft.

(176.) Every cradle or platform on which men work in the shaft shall be so protected as to prevent any one falling off.

(177.) While men are at work on any cradle or platform in the shaft the following precautions shall be strictly observed :—

- (a) The cradle or platform shall be secured to the sides of the shaft in order to prevent its swinging.
- (b) The flap over the kibble hole shall be securely fastened.
- (c) If the cradle or platform is constructed of two or more pieces hinged, the pieces shall be securely bolted together.
- (d) The cradle or platform shall not be moved except by the express direction of the manager, master-sinker or chargeman.

(178.) If work is carried on during the night the surface at the shaft top shall be efficiently lighted.

(179.) The competent person appointed under Section 14 of the Act shall during his shift have entire charge of the operations in the shaft bottom, subject, however, to the directions of the master-sinker or of the manager of the mine, and is hereinafter referred to as the chargeman.

(180.) The examination required to be made by the chargeman before the commencement of work shall be made immediately before the descent of the shift.

(181.) The chargeman shall as part of his examination before the commencement of work, or if work is carried on without any interval by a succession of shifts, then as part of his examinations during his shift, examine carefully the sides of the shaft, take off any loose stones, and otherwise satisfy himself that the shaft is in a safe condition for men to work at the bottom. When men are engaged in walling or tubbing the shaft a similar examination shall be made by a competent person appointed by the manager.

(182.) The chargeman shall be the last man to ride at the end of the shift, and, if his shift is succeeded immediately by another shift, he shall not leave the bottom of the shaft until after the descent of the chargeman of the next shift.

(183.) When stone, coal or débris or gear, tools or materials are being sent to the surface the chargeman shall see—

- (a) that the kibble is properly loaded ;
- (b) that no stones, coal or débris are packed above the level of the top of the kibble ;
- (c) that gear, tools or materials are put into an empty kibble, and, if they project above the level of the top of the kibble, are securely fastened to the bow or chains of the kibble before the kibble is sent away ;
- (d) that the kibble before being sent away from the bottom is put into line with the pulleys and carefully steadied, and that the bottom and sides are free from adhering stones and dirt.

(184.) No person shall be allowed to descend after any cessation of work in the shaft caused by the withdrawal of the workmen

for shot firing or other purposes until the chargeman, accompanied if necessary by not more than two other persons, has descended and examined the shaft and found it to be safe in all respects. If inflammable gas has been found or is likely to be found in the shaft the examination shall be made with a locked safety lamp of a type which will indicate the presence of such gas.

(185.) The winding engineman shall not work the winding engine when men are in the shaft except in pursuance of a signal received from the banksman or chargeman.

(186.) When lowering the kibble the winding engineman shall stop it when it has reached a point three fathoms above the bottom of the shaft or above any cradle or platform upon which the kibble, is to alight, and shall wait the signal from the chargeman to let it down. When raising the kibble he shall stop the engine as soon as the kibble has been raised four feet from the bottom, in order that the chargeman may see that the rope is steadied, and shall not again move his engine until he has received the signal from the banksman or chargeman.

(187.) When gear, tools or materials are being lowered the banksman shall see (a) that the kibble is properly loaded, (b) that no loose material is packed above the level of the top of the kibble and (c) that gear or tools are put into an empty kibble, and if they project above the level of the top are securely fastened to the bow or chains of the kibble, and (d) that timber and other bulky articles are safely slung.

(188.) The banksman shall at all times keep the shaft top and landing edge free from loose material.

(189.) The following signals shall be used :—

To raise up .. .. .	1
To lower down .. .. .	2
To stop when in motion .. .. .	1
When men are to ride a preliminary signal of .. .. .	3

The manager shall fix such other signals as may be required.

This Regulation shall not apply to any shaft in course of being sunk at the date of this Regulation coming into force.\*

(190.) No person other than the banksman or chargeman shall give any signal unless he is an official of the mine or is authorised in writing by the manager to give signals.

## . PART VII.

### *Repeal.*

All special rules in force at any mine under any Act repealed by the Coal Mines Act, 1911, at the time when these Regulations come into force are hereby revoked, but the revocation shall not affect any penalty incurred in respect of an offence committed against any such special rule or any legal proceeding or remedy

\* *i.e.*, on September 15, 1913.

in respect of any such penalty, and any such legal proceeding may be instituted or continued and any such penalty may be imposed as if the special rule had not been revoked.

2. GENERAL REGULATIONS, DATED AUGUST 29, 1913, AS TO ACCOMMODATION AND FACILITIES FOR TAKING BATHS AND DRYING CLOTHES, AND AS TO THE CONSTITUTION, POWERS AND DUTIES OF COMMITTEES OF MANAGEMENT.

1913. No. 950.

In pursuance of Sections 77 and 86 of the Coal Mines Act, 1911, I hereby make the following regulations and direct that they shall apply to all mines to which that Act applies and in which accommodation and facilities for taking baths and drying clothes are required under Section 77 to be provided :—

*Bathing Accommodation and Facilities.*

(1.) The accommodation and facilities for taking baths shall be provided in a building of sufficient dimensions, efficiently lighted and ventilated, kept in good repair, and while the accommodation is in use heated to a temperature of not less than 60 nor more than 75 degrees Fahrenheit.

(2.) The accommodation shall consist of spray or douche baths supplied with water at a temperature as near as may be of 100 degrees Fahrenheit, and each bath shall be contained in a cabinet constructed so as to secure privacy and having suitable arrangements for partially dressing and undressing.

(3.) The number of baths shall be in the proportion of one to every six persons in the largest shift employed at the mine.

(4.) The building shall be constructed of non-inflammable material and shall have a floor of cement or similar material so graded and drained as to allow any water to run to and be carried away at the sides of the building.

The building shall also be so constructed as to permit of the interior being easily cleaned and to prevent accumulations of dirt in any part, and for this purpose—

- (a) all corners and ledges shall be rounded and all inner surfaces of the building up to the part from which the roof springs shall be smooth ;
- (b) a space of not less than 1½ inches shall be left between the walls of each cabinet and the sides of the building, and a space of not less than 10 inches between the walls of the cabinet and the floor of the building ;
- (c) the inside wall of the building shall be constructed, to a height of not less than 7 feet from the floor, of impervious material which is capable of being readily cleaned ;
- (d) wood shall not be used for the purpose of any inside fittings except seats and doors leading to the outside ;

(e) the surface of every seat shall be of hard wood and shall be made in two or more parts, with spaces between the parts of not less than  $\frac{3}{4}$  inch.

(5.) No water shall be used for the baths which is liable to cause injury to health or to yield effluvia, and for the purpose of this Regulation any water which absorbs from acid solution of permanganate of potash in four hours at 60 degrees Fahrenheit more than 0.5 grain of oxygen per gallon of water shall be deemed to be liable to cause injury to health.

(6.) The floor of the building, the cabinets and the inside wall, up to a height of not less than 7 feet, shall be thoroughly cleansed once every day and the whole building shall be thoroughly cleansed at such fixed times as shall be decided by the Committee of Management, but at least once in every ten days. If the accommodation is used by more than one shift of persons during the day, the cabinets shall be cleansed at such intervals during the day as shall be decided by the Committee.

(7.) Every person using the accommodation shall be provided with soap, and, at the beginning of each week and at such other times as the person in charge of the baths may think necessary, with a clean towel for his sole use.

#### *Drying Accommodation and Facilities.*

(8.) Arrangements shall be made for suspending in the roof of the building the clothes of each person using the accommodation, by means of a chain, or a cord so treated as to be impervious to moisture, which shall be so arranged and fitted as to be under the sole control of the person to whom it is allotted and to keep the clothes of such person when suspended entirely separate from the clothes of any other person, and efficient means shall be provided for drying clothes when so suspended.

#### *Constitution, Powers and Duties of Committee of Management.*

(9.) The Committee of Management shall consist of three persons appointed by the owner of the mine and three persons elected by ballot\* by the workmen at the mine who are liable to contribute to the cost of maintenance of the bathing and drying accommodation and shall continue in office for the term of one year. In the case of death or resignation of any member, the vacancy shall be filled by the party which appointed such member, and the new member shall continue in office until the expiration of the term of office of his predecessor. Provided that where there are several mines belonging to the same owner of which all the shafts or exits for the time being in use in working the mines lie within a circle having a radius of five miles and baths are installed at two or more of the mines, a Joint Committee may be appointed to manage the bathing and drying accommodation and facilities

\* The manner in which the ballot is to be taken is prescribed by the Order of 22nd June, 1912, under Sec. 118 of the Act, printed on page 119.

at all mines at which such accommodation and facilities are provided. Each such mine shall be represented on the Joint Committee by two persons appointed by the owner and by two persons elected by ballot\* by the workmen at the mine who are liable to contribute.

(10.) The procedure of the Committee shall be in accordance with rules made by the Committee, and minutes of all proceedings shall be kept by the Secretary who shall be appointed by the Committee and may be paid such remuneration, if any, as the Committee decide. In the event of the Committee being equally divided on any question and not being able to come to an agreement, the question shall be referred to some person selected jointly by the representatives of the owner and of the workmen or failing agreement to some person appointed by the Inspector of the Division, whose decision shall be final.

(11.) The Committee shall be responsible for the maintenance of the building and fittings in good condition and repair and clean and fit for use ; for the maintenance of due order and discipline in the use of the accommodation and facilities provided ; for the provision of all supplies ; for the efficient working of the arrangements and for the appointment and supervision of attendants.

(12.) The Committee shall have power (i) to undertake any structural or other work necessary to the discharge of their duties as aforesaid, (ii) to appoint attendants, and (iii) to make rules as to the cleansing of the building and fittings, the maintenance of discipline and orderly behaviour among persons using the accommodation, the order in which men are to take their baths, the times for bathing, the prevention of any nuisance by persons using the accommodation or otherwise, and the prohibition of any person using the accommodation who fails to comply with the rules made by the Committee or with any directions given by the attendant in charge of the building in pursuance of such rules, or who is suffering from an infectious or contagious disease, or is liable to communicate infection, or for other sufficient reason. The Committee shall forward a copy of any rules made by them to the Inspector of the Division.

(13.) The Committee shall appoint a sufficient number of attendants, one of whom shall be in charge, under the general control of the Committee, of the accommodation and facilities provided, and shall be responsible to the Committee for enforcing the rules made by the Committee. The attendant in charge shall have power to exclude from the building any person refusing to comply with the rules of the Committee or any direction given by him in pursuance of those rules, and he shall immediately report the case in writing to the Committee.

(14.) The Committee shall insure the building and contents against fire and also effect insurances against statutory liability imposed upon them in respect of their servants.

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\* The manner in which the ballot is to be taken is prescribed by the Order of 22nd June, 1912, under Sec. 118 of the Act, printed on page 119.

(15.) The owner shall pay over to the Committee on each pay-day the sums deducted by him, in pursuance of subsection (4) of Section 77, from the wages of the workmen liable to contribute, and shall also pay over to the Committee at such times as may be agreed the amount which the owner is liable to contribute less interest at a rate not exceeding 5 per cent. per annum on capital expenditure. Proper accounts shall be kept by the Committee of all income and expenditure, and a balance sheet shall be made out annually and audited by a qualified person, and shall be placed in the building in a conspicuous place where it can be read by all persons liable to contribute.

Whitehall,  
29th August, 1913.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

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3. GENERAL REGULATIONS, DATED APRIL 1, 1913,\* AS TO THE  
HOURS OF EMPLOYMENT OF WINDING ENGINEMEN.

1913. No. 341.

In pursuance of Sections 57 and 86 of the Coal Mines Act, 1911, I hereby make the following regulations, and direct that they shall apply to all mines to which that Act applies.

(1.) A winding engineman may be employed for more than eight hours in any one day in the circumstances hereinafter mentioned, but subject to the conditions contained in these regulations.

(2.) Where winding is carried on at a shaft by a succession of shifts a winding engineman may, for the purpose of changing shifts, be employed on one day in the week for a period not exceeding sixteen hours, or for two shifts of eight hours each, provided that in either case—

(i) an interval of not less than eight hours elapses between the termination of his employment in one shift and the commencement of his employment in the next ;

(ii) the period of employment does not, on the average of any three consecutive weeks, exceed eight hours per working day.

(3.) Where winding is carried on at a shaft by a succession of shifts and when on any day the employer is unavoidably prevented from obtaining the services of one of the enginemen by reason of the illness of or of accident to such engineman, or other cause, a winding engineman may be employed for not more than twelve hours on that day, or may be employed on a system of eight-hour shifts with an interval of eight hours between each shift, provided that he shall not be so employed for more than six weeks consecutively in respect of the absence of such engineman.

(4.) Where winding is carried on at a shaft by a succession of

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\* These Regulations came into force on July 1, 1913. See the Order printed on page 112.

shifts, but the work during some period or periods of the day is much heavier than the work during other periods, and it is desirable in the interests of safety that the winding engineman employed during the period or periods of heavier work shall not be employed for so long a time as eight hours, then if such winding engineman is employed for any less time than eight hours during the day, a winding engineman employed during the other part of the day may be employed for a corresponding time in excess of the eight hours, but not exceeding ten hours in all.

(5.) Where winding is carried on at a shaft by a succession of shifts, and the winding enginemen employed at that shaft have agreed, with the consent of the Manager, to be absent in turn from the end of their shift on Saturday to the commencement of their shift on Monday, each of the winding enginemen may be employed for not more than sixteen hours both on Saturday and on Sunday in not more than two weeks in any three, or for alternate shifts of sixteen hours and twelve hours and twelve hours, or on a system of eight-hour shifts ; provided that in any case an interval of not less than eight hours elapses between the termination of the employment in one shift and the commencement of employment in the next, and provided that notice of this arrangement is affixed by the Manager in the winding engine house.

(6.)—(a) Where at any shaft one shift only of persons descends and ascends the shaft during the day, the mineral is not wound before the descent or after the ascent of that shift, a winding engineman may be employed for not more than ten and a half hours on any day at that shaft.

(b) In any mine where only two shifts of workmen are employed below ground during a day, the one a mineral-getting shift and the other a repairing shift, and mineral is not wound or got except during the hours of the mineral-getting shift, and the total output of any such mine does not exceed on the average one hundred tons of mineral per working day, a winding engineman may be employed for a period not exceeding nine hours.

(c) Where at times when no shift of men is at work in the mine it is necessary for some person or persons to descend the mine, and a person not otherwise employed to work a winding engine is employed to lower and raise such person or persons, the person so employed may be employed for more than eight hours but not for more than twelve hours in any day.

(7.) In the event of any accident to the winding machinery or other accident interfering with the lowering or raising of workmen, or in the event of any emergency requiring the continuous attendance of a winding engineman at the engine in the interests of the safety of the men or animals in or about the mine, a winding engineman may continue to be employed after the end of his shift unless and until another winding engineman regularly employed at the same shaft is available to take his place.



(8.) The Manager shall specify in a notice, which shall be kept constantly posted up in the engine room, the hours of employment of the winding engineman at a shaft, or, if the winding is carried on at that shaft in more than one shift during the day, the hours of employment of the winding engineman of each shift.

If a winding engineman is employed for more than eight hours in any one day in pursuance of any of the exemptions in these Regulations other than Regulations 3 and 7, the notice shall also state under which exemption or exemptions the extended period of employment is claimed.

(9.)—(a) The Manager shall cause a register to be kept in the engine room in the prescribed form,\* and it shall be the duty of the winding engineman on each day on which he is employed to enter in the book the hour at which he commenced his employment and the hour at which he terminated his employment on that day, or where he is employed in more than one shift on the same day the hour of commencement and termination of each shift. The register shall be examined each day by the official, if any, superior to the winding engineman, having the general charge of the machinery, or, if there is no such official, by the Manager or Under-Manager, and shall be initialled by him.

(b) Where a winding engineman is employed in pursuance of the exemption contained in Regulation 3 or Regulation 7, full particulars of the case shall be entered in the register.

*R. McKenna,*

Whitehall,  
1st April, 1913.

One of His Majesty's Principal  
Secretaries of State.

#### 4. GENERAL REGULATIONS DATED MAY 19, 1914. SPECIAL PROVISIONS FOR MINES SERVED BY A CENTRAL RESCUE CORPS, AND DEFINITION OF "BREATHING APPARATUS."

(S.R. & O., 1914, No. 710.)

As amended, July 30, 1920. (S.R. & O., 1920, No. 1423.)

†*Special Provisions for Mines served by a Central Rescue Corps.*

(1.) Nos. 140, 141, and 142 of the General Regulations above mentioned‡ shall not apply to any mine which is served by a Central Rescue Station maintaining a permanent rescue corps, and which is situated within a radius of 10 miles from the station and is in telephonic communication with it, subject to the following conditions:—

(a) The rescue corps at the Central Station shall consist of not less than six men, or if the total number of underground

\* The prescribed form of register is Mines and Quarries Form No. 51.

† For additional provisions as to selection and training of Rescue Corps, see Part III of the General Regulations dated July 30, 1920 (page 59).

‡ See pages 35–36.

employees at all the mines served by the station in pursuance of this regulation exceeds 15,000, eight men.

The members of the corps shall be carefully selected on the ground of their coolness, powers of endurance and general suitability for the work, and shall be medically certified to be fit for the work ; and they shall hold a certificate of proficiency in first aid from a society or body approved by the Secretary of State.\*

†They shall be continuously employed and in constant residence at the station ; provided that if the Secretary of State so approves, and subject to such conditions as he may lay down, members of the rescue corps may, instead of being continuously employed at the station, be engaged in mines in the immediate neighbourhood of the station.

The corps shall be thoroughly trained in the use of breathing apparatus and in rescue work in accordance with a scheme approved by the Secretary of State and shall be constantly kept in a highly efficient state.

One or more members shall be appointed to act as leaders.

(b) One or more persons employed at the mine for the time being shall be selected for the purpose of acting with the rescue corps from the Central Station when summoned, as follows :—

If the total number of underground employees is not less than 100 nor more than 250 .. ..	Not less than 1 person.
If the total number of underground employees is more than 250 but not more than 1,000 .. ..	Not less than 3 persons.
If the total number of underground employees is more than 1,000 ..	Not less than 5 persons.

They shall be thoroughly trained, and shall from time to time undergo practices, at the Central Station, in the use of breathing apparatus and in rescue work in accordance with a scheme approved by the Secretary of State.‡

They shall be carefully selected on account of their knowledge of the mine, coolness, and powers of endurance, and shall be medically certified to be fit for the work and shall hold a certificate of proficiency in first aid as above mentioned.

Subject to the limit of number specified above, so far as reasonably practicable at least one shall be selected from each shift.

Arrangements shall be made for summoning such persons immediately their services are required.

No breach of condition (b) shall be deemed to have arisen in consequence of failure to maintain at the mine the full number of trained men in accordance with the foregoing provisions if the

\* For list of Approved Societies, see page 151.

† As amended by No. 25 of the General Regulations dated July 30, 1920 (S.R. & O., 1920, No. 1423), see page 60.

‡ For approved scheme of training, see page 146.

owner, agent or manager of the mine satisfies the Inspector of the Division that he had made every effort to comply with those provisions and that the failure was due to causes over which he had no control.

(c) There shall be kept at every mine tracings of the workings of the mine up to a date not more than three months previously, showing the ventilation and all principal doors, stoppings and air crossings, regulators, and telephone stations, and distinguishing the intake air by a different colour from the return air, which tracings shall be in a suitable form for use by the corps.

(d) There shall be provided and maintained at the mine—

- (i) Two complete suits of breathing apparatus or two smoke helmets\* (that is, appliances for supplying fresh air to the user by means of a pipe and bellows) or one of each in an efficient state and constantly ready for immediate use.
- (ii) Two or more small birds or mice for testing for carbon monoxide.
- (iii) One electric hand lamp and one safety lamp for testing for fire-damp for each person trained in pursuance of condition (b) above.
- (iv) One oxygen reviving apparatus

*Definition of "breathing apparatus."*

(2.) For the purpose of the foregoing regulation and of Part IV of the General Regulations above mentioned,† breathing apparatus means an apparatus of such a character that the wearer carries with him all the means for respiration in an irrespirable atmosphere, and is not dependent for them, while in such an atmosphere, on any other person or persons.

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5. GENERAL REGULATIONS, DATED JUNE 3, 1920, APPLYING TO  
MINES IN WHICH GANISTER IS WORKED.

1920. No. 873.

In pursuance of Section 86 of the Coal Mines Act, 1911, I hereby make the following Regulations, in substitution for the General Regulations made under the said Act and dated 9th September, 1913,‡ and direct that they shall apply to all mines under that Act in which ganister or other stone containing not less than 80 per cent. of silica ( $\text{SiO}_2$ ) is worked with a view to sale or manufacture.

Provided that if the Chief Inspector of Mines is satisfied in respect of any mine that, owing to the special conditions of the

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\* The Haldane Equalising Arrangement and Air Tube and the Briggs Equalising Arrangement and Air Tube may be accepted as equivalent to smoke helmets for the purpose of this Regulation.

† See page 34.

‡ S.R. & O., 1913, No. 974.

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WORKED.

mine or otherwise, any of the requirements of these Regulations can be suspended or relaxed without danger to the health of the persons employed, he may by certificate in writing authorise such suspension or relaxation on such conditions and for such period as he may think fit. Any such certificate may be revoked at any time.

These Regulations shall come into force on the 1st July, 1920.

In these Regulations, "stone" means ganister or other stone containing not less than 80 per cent. of silica ( $\text{SiO}_2$ ).

(1.)—(a) No person shall use or cause or allow to be used in the mine any rock drill worked by a mechanical power unless a jet of water is directed on to the cutting edge of the drill during the whole time the drill is at work, or unless other means equally efficient approved by the Chief Inspector of Mines is provided and used so as to prevent the escape of dust into the air.

(b) If drilling is done by manual labour, a stream of water shall be continually directed on to the cutting edge of the drill during the whole time drilling is being done by means of a hose or syphon, or other means equally efficient approved by the Chief Inspector of Mines, so as to prevent the escape of dust into the air.

(2.) Unless an efficient waterblast or other means equally efficient approved by the Chief Inspector of Mines is used to the satisfaction of the Inspector of the Division for allaying the dust after blasting—

No person except for the purpose of making any examination required by the said Act or by any Order or Regulation under the Act shall work or pass in any place in which a shot has been fired or in any place on the return side thereof during the shift in which the shot was fired, nor until at least four hours have elapsed from the firing of the shot.

Where a waterblast is used, no person shall enter the place in which the shot has been fired until at least half an hour or such shorter period as the Chief Inspector of Mines may after experiment approve, has elapsed from the firing of the shot. A notice of any period so approved shall be kept posted in a conspicuous position at the surface of the mine.

(3.) No person shall take down any stone from the face by means of a wedge, lever, or similar appliance unless every part of the surface of the stone, including every break therein, has been effectively watered naturally or otherwise so as to prevent the escape of dust into the air.

(4.) Stone shall not be broken up below ground except so far as may be necessary to allow it to be loaded into the tub.

During the process of breaking up any stone below ground, either the part of the stone where the hammer or other tool is to be applied shall be completely covered with wet brattice cloth so as to prevent the escape of dust into the air, or suitable respirators

GENERAL REGULATIONS:—MINES IN WHICH GANISTER IS 53  
WORKED.

shall be used by the workers. In the latter case each worker shall be supplied with a respirator for his sole use, and all respirators, when required for use, shall be washed or renewed at least once every day.

(5.) No person shall, in any part of the mine below ground, remove, or cause or allow to be removed any stone, if dry and dusty, unless it has been effectively watered so as to prevent the escape of dust into the air during removal.

(6.) Efficient mechanical or other means shall be installed to maintain a constant and adequate ventilating current throughout the mine.

(7.) In every case where a working place has advanced more than 15 feet in front of the air, and in every other case where necessary, brattice or air-pipes of non-inflammable material shall be carried up to within such distance, in no case more than 15 feet, from the face as may be necessary to ensure an adequate amount of air reaching the face.

(8.) Efficient means of exhaust ventilation or an efficient watering or other arrangement shall be provided and kept provided in connection with every stone-breaking machine used at the mine to prevent the escape of dust into the air, and no person shall work, or cause or allow to be worked, any such machine unless such arrangement or means is provided and effectively used.

(9.) Notices calling attention to the danger arising to the health of the workers from the practice of spitting shall be kept affixed in conspicuous positions at the mine where they may be easily read by the persons employed.

(10.) It shall be the duty of the Owner, Agent or Manager to see that an ample supply of clean water under such pressure as may be necessary for the purpose of compliance with the foregoing Regulations is available in every working place, and that all appliances or other things necessary to enable the above Regulations to be carried out, are provided and used in accordance with these Regulations and are maintained in working order.

(11.) It shall be the duty of all persons employed in the mine to comply with the requirements of the Regulations, and with such instructions as shall be given to them by the officials with a view to such requirements being carried out, and it shall be the duty of all persons employed in the mine, whether workmen or officials of the mine, to report any breach of these Regulations to the Manager.

*E. Shortt,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
3rd June, 1920.

6. GENERAL REGULATIONS, DATED JULY 30, 1920. (S.R. & O., 1920. No. 1423.)

As amended November 20, 1924. (S.R. & O., 1924, No. 1364.)

\* PART I.—PRECAUTIONS AGAINST COAL-DUST [SECTION 62].

(1.) The following regulations shall apply to all mines in which coal other than anthracite is worked.

(2.) The floor, roof and sides of every road or part of a road which is accessible shall be treated in one of the following ways, either :—

(a) they shall be treated with incombustible dust in such manner, and at such intervals, as will ensure that the dust on the floor, roof and sides respectively shall always consist throughout of a mixture containing not more than 50 per cent. of combustible matter ; or

(b) they shall be treated with water in such manner, and at such intervals, as will ensure that the dust on the floor, roof and sides respectively is always combined throughout with 30 per cent. by weight of water in intimate mixture ; or

(c) they shall be treated in such other manner as the Board of Trade may approve.

Provided that the percentage of incombustible dust required under this Regulation may be reduced by an amount equivalent to the percentage of water present in the mixture.

Provided also that the obligation imposed by this Regulation shall not apply in respect of any road or part of a road, either

(a) in a seam in which anthracite only is worked, or

(b) if, and so long as, the natural conditions thereof as regards presence of incombustible dust and moisture are found by tests made in accordance with these Regulations to be such as to comply with the foregoing requirements.

(3.) The incombustible dust used for the purpose of the preceding regulation shall contain not less than 50 per cent. by weight of fine material capable when dry of passing a sieve with 200 meshes to the linear inch (40,000 to the square inch).. Provided that if a larger proportion of incombustible dust is used than is required under the foregoing regulation, the percentage of fine material aforesaid contained in the incombustible dust may be reduced proportionately, but shall not fall below 25.

(4.) For the purposes of testing the composition of the dust mixture in any part of a road, the following procedure shall be adopted :—

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\* As amended by the Coal Mines General Regulations of the 20th November, 1924 (S.R. & O., 1924, No. 1364).

- (a) Representative samples of the dust shall be collected from the floor, roof and sides respectively over an area of road not less than 50 yards in length.
- (b) Each sample collected shall be well mixed and a portion of the mixture shall be sieved through a piece of metallic gauze having a mesh of 28 to the linear inch.
- (c) A weighed quantity of the dust which has passed through the sieve shall be dried at 212° Fahrenheit and the weight lost shall be reckoned as moisture. The sample shall then be brought to a red heat in an open vessel until it no longer loses weight. The weight so lost by incineration shall be reckoned as combustible matter for the purposes of the test.

Provided that in the case of dusts to which the foregoing test would not be applicable, the test shall be such as may be prescribed\* ; if any dispute arises as to the test which should be applied it shall be determined in the manner provided by the Act for settling disputes.†

Tests of samples of dust, so taken as to be representative of the normal composition of the dust throughout the roads of the mine on the floor, roof and sides respectively, shall be made as often as may be necessary but not less frequently than once a month.

The results of the tests shall be posted at the pithead and recorded in a book to be kept at the mine for the purpose in accordance with the provisions of Section 24 of the Act.

Provided that if the representative tests show in respect of any mine or of any part of a mine that the natural conditions as regards presence of incombustible dust and moisture are such as to comply with the requirements of these Regulations, it shall suffice thereafter to make representative tests in respect of that mine or that part of a mine at intervals not exceeding three months or at such longer intervals as may be approved in writing by the Inspector of the Division.

(5.) No dust shall be used for the purpose of complying with these regulations of a kind which may be prohibited by the Board of Trade on the ground that it would be injurious to the health of persons working in the mine. Provided that if any dispute arises as to whether the dust is injurious, it shall be determined in the manner provided by the Act for settling disputes.†

(6.) Paragraph 3 of Section 62 of the Act shall be amended to read as follows :—The floor of every travelling road shall be cleared of dust at regular intervals of time so as to keep it free from all accumulations of dust. The intervals shall be fixed by agreement between the Manager and the workmen employed in the mine, or their representatives, or in default of agreement, by the Inspector of the Division.

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\* Special tests have been prescribed for (a) Dust Mixtures which contain carbonates ; (b) Moist Dust Mixtures which cannot be sieved ; and (c) Dust Mixtures which contain Gypsum : see pages 152 and 153.

† See page 115.

“ Travelling road ” means a road used by the main body of any shift employed in the mine for travelling to or from their working places, and where the mine is divided into districts, the road used by the main body of men employed in a district.

(7.) In the foregoing regulations “ road ” includes all roads of any description extending from the shaft or outlet to within 10 yards of the coal face, but chutes from the coal face down which coal is thrown, offices, stables, engine-houses, motor switch and transformer rooms and pump-rooms, shall not be deemed to form part of any road.

(8.) This Part of the Regulations shall not come into force until 1st January, 1921, provided that if it is shown to the satisfaction of the Inspector of the Division in regard to any mine, that it has not been practicable by that date to obtain the necessary plant for carrying out the Regulations, the Divisional Inspector may, subject to such conditions as he thinks fit, allow such extension of time as shall appear to him to be reasonably required.

## PART II.—PRECAUTIONS AGAINST SPONTANEOUS COMBUSTION OF COAL.

(9.) The following provisions shall apply to any mine or part of a mine in which safety lamps are required by Section 32 of the Act or by any Order or Regulations made under the Act to be used, and to any other mine where the Board of Trade direct that they shall apply in view of the conditions existing in that mine. If any question arises as to the reasonableness of any such direction, it shall be determined in the manner provided by this Act for settling disputes\* :—

(i) On the appearance in any part of the mine of smoke or other sign indicating that a fire has or may have broken out below ground, every workman other than those necessarily engaged in dealing with the emergency shall be withdrawn from the ventilating district or districts affected, and before any workman is readmitted into the district or districts affected, the manager or under-manager, accompanied by the fireman, examiner or deputy and by two persons selected by the workmen employed in the mine, shall examine the district or districts and shall make a full and accurate report† of the condition of the district or districts, and no workman shall be readmitted unless the manager or under-manager and the representatives of the workmen, if any, making the examination report the mine to be safe. If there is a disagreement between the manager or under-manager and the representatives of the workmen as to whether the mine is safe for the readmission of the men the question shall be referred to the Inspector of the Division or the Senior Inspector of Mines,

\* See page 115.

† The prescribed form of Report of Examinations made in pursuance of Regs. 9 (i), 9 (ii), 9 (iii) and 10 is Mines and Quarries Form No. 75.



whose decision shall be final. Every such report shall be signed by the persons making the examination and shall indicate if possible by means of a plan the situation of the fire. The report shall be kept at the office of the mine and a copy shall be posted up at the pit-head the same day. The Manager shall not be bound to delay the examination if after reasonable notice the representatives selected by the workmen are not readily available.

The reports\* made by the responsible official appointed to supervise the affected area shall be posted up at the pit-head at the end of each shift for the information of the workmen.

(ii) When the existence of a fire has been definitely ascertained, every workman, except those engaged in combating the fire, shall be withdrawn from the seam in which the fire exists and from every other seam communicating with the shaft on the same level, and shall not be readmitted until an examination has been made and the seam or seams reported to be safe in the manner indicated above.

Provided that—

(a) it shall not be necessary to withdraw the workmen on the intake side of the fire if the seam, or in cases to which proviso (b) applies, the ventilating district, in which the fire exists is naturally wet throughout, and it is reported after examination made in the manner indicated above that it is safe for such men to remain ;

(b) it shall only be necessary to withdraw the workmen from the ventilating district or districts in which the fire exists if each ventilating district in the seam is adequately protected against the spread of an explosion of coal-dust from any other district by some means approved by the Board of Trade ;

(c) it shall not be necessary to withdraw the workmen from any seam communicating with the shaft on the same level if such seam is naturally wet throughout or is adequately protected against the spread of an explosion of coal-dust from the seam in which the fire exists by some means approved by the Board of Trade.

(iii) While a fire is being dammed off, every workman in the mine, except the men engaged in the work of damming off the fire, shall be withdrawn from the mine, and shall not be readmitted after the completion of the work until an examination has been made, and the mine reported to be safe, in the manner indicated above.

There shall be available during the whole time, at or near the place, two suits of breathing apparatus or two smoke helmets,† and persons competent to use them. .

\* The prescribed form of Report is Mines and Quarries Form No. 76.

† The Haldane Equalising Arrangement and Air Tube and the Briggs Equalising Arrangement and Air Tube may be accepted as equivalent to smoke helmets for the purpose of this Regulation.

(iv) Such means as may be approved by the Board of Trade for the purpose shall be taken to render harmless the coal-dust in all accessible parts of the mine immediately contiguous to the seat of the fire.

(v) The Board of Trade may, after consultation with the owners and the representatives of the miners, by Order modify the requirements of this regulation in respect of any mine, to such extent and subject to such conditions as he may think fit, if he is satisfied that this can be done without danger in view of the special character of the mine.

(10.) Where in any mine or part of a mine to which the foregoing regulation does not apply the existence of a fire has been definitely ascertained—

an examination of the place in which the fire exists shall be made in the manner indicated above, and if any part is reported to be dangerous the workmen, except those engaged in combating the fire, shall be withdrawn from such part. Provided that if there is a disagreement between the manager or under-manager and the representatives of the workmen as to whether any part is dangerous or not, or has been rendered safe, the question shall be referred to the Inspector of the Division or the Senior Inspector of Mines, whose decision shall be final.

When the workmen have been withdrawn from any part of the mine in pursuance of this regulation they shall not be re-admitted until a further examination has been made and such part reported to be safe in the manner indicated above.

### PART III.—RESCUE.

#### (a) *Design and testing of apparatus.*

(11.) The breathing apparatus provided at a rescue station or mine in pursuance of the General Regulations of the 10th July, 1913,\* and 19th May, 1914,† with regard to rescue work (hereinafter referred to as the existing Regulations) shall be of a type for the time being approved‡ by the Board of Trade, and no other breathing apparatus shall be used at any station or mine, except that any breathing apparatus at present in use may, with the consent of the Chief Inspector of Mines, be continued in use until the 1st January, 1922, or until such later time as apparatus of the approved type is obtainable in sufficient numbers.

(12.) In every breathing apparatus which is arranged so as to give a uniform oxygen delivery the reducing valve shall be so adjusted as to supply not less than 2 litres of oxygen per minute.

\* S.R. & O., 1913, No. 748, see Nos. 142 and 143, pages 36-37.

† S.R. & O., 1914, No. 710, see page 49.

‡ For memorandum on the test of rescue apparatus, see Appendix V (page 142); and for list of breathing apparatus approved for use in mines and at Central Rescue Stations, see Appendix VI (page 151).

(13.) The oxygen in every cylinder supplied for use in connection with breathing apparatus shall be analysed before being used in a breathing apparatus, and if the oxygen is found to contain more than 2 per cent. of impurities, it shall not be used in any work or practice below ground, or in any practice above ground where the person wearing the apparatus is liable to be out of sight of the instructor. A record of the results of every analysis shall be kept in a book at the station or mine, as the case may be.

(14.) Every breathing apparatus shall on each occasion before being used below ground or in an irrespirable atmosphere in any practice be tested for leakage in the prescribed manner.\*

(15.) Every breathing apparatus shall be thoroughly tested at least once a month in a prescribed manner,† and a record of the results of the tests shall be kept in a book at the station or mine, as the case may be.

(16.) If the Chief Inspector of Mines or the Inspector of Mines for the Division so requires, any breathing apparatus in use at a station or a mine shall be retested in the prescribed manner.‡

(17.) Flow meters in use at a station or a mine shall be tested for accuracy at least once in every six months, and a record of the results of the tests shall be kept in a book at the station or mine, as the case may be.

*(b) Additional provisions as to selection and training of  
Rescue Corps and Rescue Brigades.*

(18.) No person shall be employed in a rescue corps or in a rescue brigade, and no person shall be selected at a mine for the purpose of acting with a rescue corps, unless he has passed the prescribed physical and medical test,‡ or, if the superintendent of the rescue station or the captain of the brigade considers him unsuitable for rescue work with breathing apparatus, and (in the case of men hereafter selected) unless he has had practical experience in a mine.

(19.) Every rescue corps shall, after the completion of its training, undergo at least six practices underground in mines with breathing apparatus every year and at least one such practice in every quarter.

(20.) There shall be appointed at every station a sufficient number of persons competent to train a rescue corps or rescue brigade, as the case may be, and to take charge of the station of whom at least one shall always be in attendance, and the number shall, in no case, be less than the number specified in the following scale :—

(i) At stations maintaining a permanent rescue corps.—If the total number of persons employed underground at

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\* For prescribed test for leakage, see page 149.

† For prescribed tests for breathing apparatus, see page 149.

‡ For prescribed physical and medical tests, see page 150.

the mines served by the station does not exceed 15,000, two ; if the number exceeds 15,000, three.

- (ii) At stations not maintaining a permanent rescue corps.—  
If the total number of brigades required to be provided at the mines served by the station does not exceed 50, two ; does not exceed 100, three ; exceeds 100, four.

(c) *Miscellaneous Provisions.*

(21.) In the mine tracings required to be kept at the mine by the existing Regulations,\* the signs used shall be those specified in the First Schedule to this Part of these Regulations.†

(22.) The code of signals used in rescue operations shall be the uniform code specified in the Second Schedule‡ to this Part of these Regulations.

(23.) The rules for the conduct and guidance of persons employed in rescue work required by the existing Regulations to be adopted at every mine shall embody the uniform code of rules contained in the Third Schedule§ to this Part of these Regulations.

(24.) At every mine to which the existing Regulations apply, there shall be a room provided and maintained exclusively for rescue and aid purposes. The room (a) shall be situated on the surface conveniently near the entrance of the mine and shall be distinguished by a large red cross on the door ; (b) shall have a floor space of not less than 100 square feet and shall be provided with ample means of natural and artificial lighting and heating, with a strong table and sufficient lockers, drawers and shelves for storing the articles required to be provided by the existing Regulations and with a plentiful supply of drinking water and water for washing ; (c) shall be placed under the charge of a person appointed in writing by the manager, who shall hold a certificate of proficiency in first aid from a society or body approved by the Board of Trade,|| and shall also always be readily available during working hours and shall be responsible for maintaining the room and the fittings and appliances thereof in good order, and for attending to the needs and comfort of any rescue team or rescue brigade engaged in practices or work at the mine.

(25.) [*This Regulation amended No. 1 of the General Regulations of May 19, 1914 (S.R. & O., 1914, No. 710). See page 50.*]

(26.) Where a mine is situated within 10 miles of a Central Rescue Station and the Board of Trade are satisfied that the authority controlling the station is prepared to admit the mine

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\* See No. 142 (b) of the General Regulations dated July 10, 1913, page 36.

† See page 61.

‡ See page 62.

§ See page 62.


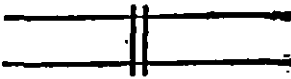

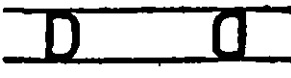

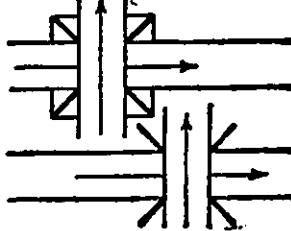

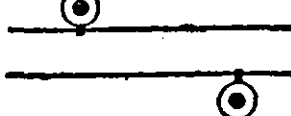


|| For list of Approved Societies, see Appendix VI, page 151.

to membership of the station on reasonable terms, they may require that the mine become a member of that station.

(27.) The existing Regulations\* and these Regulations relating to rescue shall, on and after 1st January, 1921, extend to every mine of oil shale, provided that the Inspector of the Division may, subject to such conditions as he thinks fit, allow any mine such extension of time as shall appear to him to be reasonably required in order to enable the mine to make the necessary arrangements.

*First Schedule.*

CODE OF VENTILATION SIGNS.

Brick, Stone, or Concrete Stoppings, explosion proof ( <i>General Regulation 91</i> ) .. .. .	
Brick, Stone, or Concrete Stoppings other than the above .. .. .	
Fire Dams or Seals .. .. .	
Doors .. .. .	
Regulators .. .. .	
Air Crossings, explosion proof ( <i>Section 42 (3), C.M.A., 1911</i> ) .. .. .	
Air Crossings other than the above .. .. .	
Telephones .. .. .	
Underground Ambulance Station ( <i>in red</i> ) ..	
Direction of Air Current.. .. .	
Intake Airways—Blue.      Return Airways—Red.	

\* *i.e.*, General Regulations dated July 10, 1913, Part IV, *see* page 34 ; and General Regulations dated May 19, 1914, *see* page 49.

*Second Schedule.*  
CODE OF SIGNALS.

Electric Signalling.	Signalling between Members of a Brigade.	Signal.
"Distress" or "Help Wanted." (If NO ANSWER is given to a call, "Distress" is to be understood.)	"Distress" or "Help Wanted."	ONE ring or ONE hoot.
"Not understood" or "Repeat the Message."	Halt .. .. .	TWO rings or TWO hoots.
"No" .. .. .	Retire .. .. .	THREE rings or THREE hoots.
"Yes" or "All right" or "All's well."	Advance .. .. .	FOUR rings or FOUR hoots.
To "ring up." To "ring off."	To call attention ..	FIVE rings or FIVE hoots.

*Third Schedule.*UNIFORM CODE OF RULES FOR THE CONDUCT AND GUIDANCE  
OF PERSONS EMPLOYED IN RESCUE WORK.MANAGER OR PRINCIPAL OFFICIAL FOR THE TIME BEING AT THE  
SURFACE OF THE MINE.

1. On receiving information of any occurrence likely to require the service of a rescue corps or brigade, the following steps shall be taken by the Manager, or, in his absence, by the principal official present at the surface :—

- (a) Telephone to the Central Rescue Station. Inform the Instructor of the character of the occurrence. State whether assistance will be needed from rescue brigades other than the permanent station corps or the brigades attached to the mine ;
- (b) Summon the trained men attached to the mine ;
- (c) Telephone for medical assistance ;
- (d) Telephone to the Inspector of Mines and the local offices of the Miners' Union and the Firemen's, Examiners', or Deputies' Association ;
- (e) If necessary, communicate with the police station.

2. No person shall be allowed to enter the mine or the part of the mine which is unsafe for the purpose of engaging in rescue operations unless authorised by the Manager, or, in his absence, by the principal official of the mine present at the surface ; and, during the progress of such operations, a person or persons shall be stationed at the entrance of the mine, and required to keep a written record of all persons entering and leaving the mine. Only men trained with the apparatus shall be permitted to enter the mine for the purpose of using breathing apparatus.

3. Prior to sending a brigade underground clear instructions shall be given to the leader of the brigade as to where it shall go and what it shall attempt. Unless the leader is personally thoroughly familiar with the roadways in question, the route shall be marked on a tracing, which the leader shall take with him into the mine.

4. A qualified medical man shall be in attendance at the mine wherever rescue parties are at work, unless in the opinion of the Manager and of the Inspector of Mines and Miners' representative (if present) that course is unnecessary.

The doctor, when present, shall examine every man engaged in rescue work before permitting him to go underground for a second spell of that work.

5. As soon as possible a base or bases shall be established in fresh air, but as near to the irrespirable zone or zones as safety permits. Each such base shall, if possible, be connected by telephone to the surface or to the shaft bottom. Whenever men are at work beyond the base there shall be stationed at the base as soon as possible the following :—(a) Two men, of whom at least one should understand rescue appliances and first aid ; (b) a spare brigade with rescue apparatus and ready for immediate service ; (c) one or more oxygen revivers, stretchers and birds.

CAPTAIN OR LEADER OF A RESCUE BRIGADE.

6. The leader shall not permit the brigade to go underground until he has received clear instructions from the Manager or from the person acting on the Manager's behalf ; and, unless the leader knows the route thoroughly, he shall take underground a plan on which the route is clearly marked.

7. The leader shall not engage in manual work. He shall give his attention solely to directing the brigade and to maintaining its safety. He shall examine the roof and supports during the journey inbye, and, if there is any likelihood of a fall, he shall not proceed until the brigade has made the place secure. He shall not take the brigade through any passage less than two feet high and three feet wide, except in a case of urgent necessity.

8. When the atmosphere is clear, the leader shall, when passing the junction of two or more roads, clearly indicate the route by means of arrow-marks in chalk. When the atmosphere is thick with smoke the leader shall see that a life-line is led in from fresh air, and shall not allow any member of the brigade to move out of reach of that line ; or, if that course is impracticable, he shall not proceed until every road branching from the route is fenced across the opening.

9. Before proceeding underground the leader shall test, or witness the testing of, every rescue apparatus of the brigade. He shall check the equipment of his party, and, immediately before entering irrespirable air, make sure that every apparatus is working properly.

10. When using rescue apparatus the leader (who shall carry a watch) shall read the pressure of the compressed oxygen every 20 minutes, or thereabouts, and shall commence the return journey in ample time. In travelling he shall adapt the rate to that of the slowest member.

MEMBERS OF RESCUE BRIGADES.

11. Members of brigades shall, in general, use the prescribed signals in communicating to one another.

12. In travelling with rescue apparatus, each member of the brigade shall keep the place given him when numbering off. If the pace is too quick, or if distress is felt for any reason, the member shall at once sound the distress signal.

13. No person shall commence a second or subsequent spell of work in bad air without being examined and passed by a doctor, if present, or by the rescue station instructor or other competent person if the doctor be not present.

PART IV.—ELECTRICITY ON SURFACE [SECTION 60].

(28.) *[By this Regulation Part III of the General Regulations of July 10, 1913, was amended to apply to apparatus above-ground, subject to certain amendments. See page 27.]*

## PART V.—WORKINGS UNDER MOSS, &amp;C.

(29.) Where coal or other mineral is being worked or roads driven under moss, quicksand, or other liquid matter (other than water), the following precautions shall be taken :—

- (i) The nature and thickness both of the moss, quicksand, or other liquid matter and of the strata lying between it and the workings or roads shall be ascertained as accurately as possible by boring at a sufficient number of points or otherwise.
- (ii) If the thickness of the intervening strata is found at any point to be less than 60 feet or ten times the thickness of the seam worked or proposed to be worked, whichever is greater, no further work except work necessary for the preservation of the mine shall be carried on below ground except with the consent of the Board of Trade and subject to such precautions as they may direct. The Board of Trade may vary the precautions from time to time.
- (iii) Before any decision is given or the precautions are varied by the Board of Trade the matter shall be referred for consideration by a Committee consisting of the Divisional Inspector of Mines, one representative of the management and one representative of the persons employed in the mine, who shall submit their recommendations to the Board of Trade.
- (iv) If the owner, agent, or manager objects to the decision of the Board of Trade, the matter shall be settled in the manner provided by the Coal Mines Act, 1911, for settling disputes.\*

## PART VI.—MISCELLANEOUS.

(30.) [*This Regulation amended paragraphs (a) (1) and (a) (2) of No. 92 of the General Regulations dated July 10, 1913. See page 14.*]

(31.) In any mine or part of a mine in which safety lamps are required to be used, a safety lamp shall not be unlocked or opened. This Regulation shall not apply to the ironstone mines of the Cleveland district, and it shall not come into force until such date† as may be determined by the Board of Trade after the receipt of the report‡ of the Miners' Safety Lamps Committee.

(32.) When a shaft is being sunk through water-bearing strata, at least four ladders shall be provided from the bottom of the shaft as a means of escape in case of emergency to the surface or some other place of safety. Provided that where not more

\* See page 115.

† This date has not yet been determined.

‡ Miners' Lamps Committee Memorandum No. 9.



than ten persons are employed below ground at any one time it shall not be necessary to provide more than two ladders.

(33.) [*This Regulation amended No. 128 (c) of the General Regulations dated July 10, 1913. See pages 23 and 31.*]

7. GENERAL REGULATIONS DATED FEBRUARY 10, 1922, RELATING TO THE USE OF HORSES AND OTHER ANIMALS IN MINES.

1922. No. 113.

In pursuance of Section 86 of the Coal Mines Act, 1911, and under the provisions of the Mining Industry Act, 1920, the Board of Trade hereby make the following Regulations and direct that they shall apply to all mines to which the Coal Mines Act, 1911, applies.

1. The Third Schedule to the Coal Mines Act, 1911, shall be amended by the addition of the following paragraph :—

No horse shall be taken into or out of any part of a mine upon a bogie or other carriage excepting in a case of necessity arising through accident, or through injury to or illness of the horse ; provided that nothing in this Regulation shall apply to the lowering or raising of a horse either through a shaft or by way of an incline where a horse could not walk with safety owing to the gradient.

2. Sub-section (2) of Section 45 of the Coal Mines Act, 1911, shall be amended by the omission of the words " to get to its work."

3. These Regulations shall come into force on the 31st March, 1922, and may be cited as the Coal Mines General Regulations of the 10th February, 1922.

*W. C. Bridgeman,*  
Secretary for Mines

Mines Department,  
46, Victoria Street,  
London, S.W. 1  
10th February, 1922.

## The Explosives in Coal Mines Order of the 1st September, 1913. (S.R. & O., 1913. No. 953.)

As amended March 30, 1915 (S.R. & O., 1915, No. 278); November 14, 1919 (S.R. & O., 1919, No. 1,687); August 31, 1922 (S.R. & O., 1922, No. 1,000); September 1, 1924 (S.R. & O., 1924, No. 1,016), and November 10, 1926 (S.R. & O., 1926, No. 1404).

### PART I.

#### GENERAL PROVISIONS.\*

1.—(a) No explosive substance shall be stored underground in any mine. The owner, agent or manager of the mine shall provide a suitable place or places of storage above-ground for all explosives intended to be used in the mine and shall make suitable provision conveniently near the entrance of the mine for the storage of surplus explosive brought out of the mine at the end of each shift.† If any explosive remains in the possession of a workman at the end of his shift, either he shall bring it with him out of the mine and return it at once to the place of storage provided for the purpose, or, if the explosive is required for a shift immediately following, he shall deliver it personally to the workman succeeding him in his working place.

(b) No explosive shall be taken or used underground except in cartridges, and such cartridges shall be taken into the mine and kept until about to be used for the charging of a shot hole in a secure case or canister containing not more than five pounds, and a person shall not have in use at one time in any one place more than one of such cases or canisters. No explosive shall be taken or used underground except in cartridges of the diameter of  $\frac{7}{8}$  inch,  $1\frac{1}{4}$  inches,  $1\frac{7}{8}$  inches,  $1\frac{3}{4}$  inches, or 2 inches, or in the ironstone mines in the Cleveland District, in cartridges of the diameter of  $1\frac{3}{8}$  inches.

(c) No drill shall be used for the boring of a shot hole unless it allows at least a clearance of  $\frac{1}{8}$  inch over the diameter of the cartridge which is intended to be used in the shot hole, and no person shall attempt to charge a shot hole unless such clearance exists.

(d) If explosives containing nitro-glycerine are used, proper warming pans shall be provided by the owner, agent or manager, and used when necessary.

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\* The Coal Mines Act, 1911, provides that "no explosives shall be taken into or used in any mine except explosives provided by the owner, and the price, if any, charged by the owner to the workman for any explosives so provided shall not exceed the actual net cost to the owner," Section 61 (2).

† See Memorandum on the storage of explosives printed in Appendix III.

**\* (e).—(i)** Detonators shall be kept in a place of storage provided in pursuance of Clause 1 (a) of this Order until issued.

**(ii)** The detonators in any place of storage as aforesaid shall be under the sole control of the manager or some one person specially authorised in writing by the manager to have such control in respect of that place of storage for the time being.

**(iii)** The manager or other person for the time being having control of detonators as aforesaid shall only issue detonators—

**(a)** in mines to which Part II of this Order applies, to shotfirers appointed in pursuance of Clause 6 of this Order ;

**(b)** in other mines, to such officials of the mine, who shall be either firemen, examiners or deputies of the mine, or underground officials of the mine superior to the firemen, examiners or deputies, as are specially authorised in writing by the manager for the purpose. Provided that, in any such mine, if shotfirers are appointed for the mine subject to the same conditions and having the same duties as shotfirers in mines to which Part II of this Order applies, detonators may be issued to such shotfirers.

**(iv)** Every person to whom detonators are issued as aforesaid shall keep the detonators until they are about to be used for the charging of a shothole, in a suitable case or box, which shall be provided by the owner and which shall be kept securely locked and separate from any other case or box containing explosive, and shall be used only for the storage of the detonators.

**(v)** No person shall take into the mine or have in his possession in the mine any detonators except in accordance with the foregoing provisions.

**(vi)** In the case of a shaft being sunk from the surface or deepened, it shall not be deemed a contravention of the foregoing provisions if the primers for charges are fitted with detonators on the surface before being taken into the shaft, provided the primers are so fitted in a workshop established under Section 47 of the Explosives Act, 1875, and are only taken into the shaft immediately before use by the shotfirer or other authorised person and in a thick felt bag or other receptacle sufficient to protect them from shock.

**2.—(a)** Every charge shall be placed in a properly drilled and placed shot hole, and shall have sufficient stemming, and each such charge shall consist of a cartridge or cartridges of not more than one description of explosive. It shall be the duty of the person firing the shot to satisfy himself that these requirements are fulfilled before he fires the shot.

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\* As amended by the Explosives in Coal Mines Order of March 30, 1915 (S.R. & O., 1915, No. 278).

(b) No iron or steel scraper, charger, tamping rod, or stemmer shall be taken into or used in the mine; and only clay or other non-inflammable substances shall be used for stemming, and shall be provided by the owner, agent or manager of the mine.

(c) No explosive shall be forcibly pressed into a hole, and, when a hole has been charged, the explosive shall not be unrammed, nor shall any part of the stemming be removed nor shall the detonator leads be pulled out.

(d) Before any shot is charged, the direction of the hole shall, where possible, be distinctly marked on the roof or other convenient place.

(e) The person firing the shot shall, before doing so, see that all persons in the vicinity have taken proper shelter, and he shall also take suitable steps to prevent any person approaching the shot. He shall also himself take proper shelter. If he has reason to believe that there is a possibility of the shot blowing through into an adjoining place he shall send verbal warning to the persons in that adjoining place to take proper shelter.

(f) No shot shall be fired in any mine except by means of an efficient magneto-electrical apparatus or by means of a fuze complying with the conditions and ignited in the manner specified in the Fourth Schedule hereto. Provided that in a coal mine or part of a coal mine in which the use of safety lamps is not required and to which Part II of this Order does not apply and in any mine not being a coal mine, shots may be fired by means of squibs of the character specified in the Fifth Schedule hereto, subject to the following conditions:—

(a) Squibs shall not be taken into the mine except in a suitable metal case, separate from any other explosive, and shall be kept in the case until about to be used for the firing of a shot.

(b) No person shall shorten, bend or untwist the slow match or touch, or light it except at the extreme outer end, or in any other way expedite its burning.

(c) No person shall relight a touch which has died out or been extinguished.

No person shall take into a mine or have in his possession any squib other than a squib of the character specified in the Fifth Schedule.

(g) The person firing the shot shall, after the shot has been fired, make a careful examination of the place and see that it is safe in all respects.

\*(h) Where shots are fired electrically they shall only be fired by a person authorised in writing by the manager for the purpose. The authorised person shall not use, for the purpose of firing,

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\* As regards shot-firing cables, see also No. 133 of the General Regulations of July 10, 1913 (page 26).

a cable which is less than 20 yards in length. He shall himself couple up the cable to the fuze or detonator wires and shall do so before coupling the cable to the firing apparatus. He shall take care to prevent the cable coming into contact with any power or lighting cables. He shall also himself couple the cable to the firing apparatus. Before doing so, he shall see that all persons in the vicinity have taken proper shelter.

(i) Every electrical firing apparatus shall be provided with a push button, and with a removable handle which shall not be placed in position until the shot is required to be fired, and which shall be removed as soon as a shot has been fired. The removable handle shall at all times remain in the personal custody of the authorised person whilst on duty. For the push button there may be substituted an arrangement by which the firing contact is automatically made at the end of the travel of the handle and on the release of the handle is automatically broken.

3. If a shot misses fire :—

\*(a) The person firing the shot shall not himself approach or allow any other person to approach nor shall any person knowingly approach the shothole until an interval has elapsed of not less than ten minutes in the case of shots fired by electricity or by a squib, and not less than an hour in the case of shots fired by other means.

\*(b) If the person firing the shot has occasion to leave the place, he shall fence off the place before leaving, and attach to each fence a danger board indicating the presence of a miss-fired shot.

(c) A second charge shall not be placed in the same hole.

\*(d) If the shot was fired electrically the person firing the shot shall, before approaching or allowing anyone to approach the shothole, disconnect the cable and the removable handle from the firing apparatus and shall examine the cable and connections for any defect, and no person shall knowingly approach the shothole until this has been done.

(e) Except where the miss-fire is due to a faulty cable or a faulty connection, and the shot is fired as soon as practicable after the defect is remedied, another shot shall be fired in a fresh hole which shall be drilled not less than 12 inches away from the hole in which the shot has missed fire, and shall, as far as practicable, be parallel with it.

(f) If the miss-fired shot contained a detonator, the person firing the second shot shall, before doing so, attach a string to the electric leads or the fuze of the miss-fired shot, and secure it by attaching it to the cable or to a prop or otherwise.

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\* As amended by the Explosives in Coal Mines Order of the 31st August, 1922 (S.R. & O., 1922, No. 1000).

(g) After the second shot has been fired no person shall work in the place until the person firing the shot or an official of the mine has made a careful search for the detonator and charge of the miss-fired shot. If the detonator and charge are not found, the stone or mineral shall be loaded under the supervision of the person firing the shot, or an official, and sent to the surface in a specially marked tub. The search for the detonator and charge, and the loading of any stone or mineral which may contain a detonator, shall be carried out as far as possible without the use of tools.

(h) Should the miss-fired shot not be dislodged by the second shot, further holes must be drilled and the same precautions taken as aforesaid.

(i) The person or persons firing the shots shall report the circumstances to the manager or under-manager without delay, and the number of cartridges, if any, which have not been found, and hand to him the detonator and charge, if found.

4. The foregoing provisions of clause 2 (c) as to the removal of any part of the stemming and the pulling out of detonator leads and of clause 3 as to miss-fired shots shall not apply in cases in which an exemption\* has been granted by the Board of Trade on the ground that an appliance is used which enables the detonator to be removed with safety after the shot hole has been charged.

## PART II.

### SPECIAL PROVISIONS.

5.—(a) In all coal mines in which inflammable gas has been found within the previous three months in such quantity as to be indicative of danger, no explosive, other than a permitted explosive as hereinafter defined, shall be used in or taken for the purpose of use into the seam or seams in which the gas has been found, or any shaft or drift communicating therewith which is in process of being sunk, deepened, driven or enlarged, as the case may be.

(b) In all coal mines which are not naturally wet throughout no explosive, other than a permitted explosive as hereinafter defined, shall be used in or taken for the purpose of use into any road or any dry and dusty part of the mine, or any shaft or drift communicating therewith which is in process of being sunk, deepened, driven or enlarged, as the case may be.

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\* Exemptions have been granted in respect of shots which are fired with the use of the apparatus known as (1) the "P.P." apparatus, and (2) the "Adder" apparatus.

6. In all cases in which permitted explosives are required by this Order to be used:—

\*(a) Competent persons (in this Order called shotfirers) shall be appointed in writing by the manager for the purpose of firing shots, and no shot shall be fired except by a shotfirer. No person whose wages depend on the amount of mineral to be gotten shall be so appointed, and no person not employed as a shotfirer prior to the commencement of this Order shall be qualified to be appointed or to be a shotfirer unless:—

(i) he is the holder of a first or second class certificate of competency under the Coal Mines Act, 1911, or is 23 years of age or upwards and has had at least 5 years' practical experience underground in a mine of which not less than 2 years have been at the face of the workings of a mine; and

(ii) he has obtained the like certificates† as to his ability to make accurate tests for inflammable gas and as to his eyesight as are required by Section 15 of the Act in the case of firemen, examiners or deputies. The provisions as to such certificates shall so far as applicable have effect as if incorporated in this Order. Provided that this requirement shall not apply to shotfirers employed in mines in which inflammable gas is unknown.

(b) A shotfirer shall keep a daily record (in a book‡ which shall be kept at the mine for the purpose in accordance with the provisions of Section 24 of the Act) of the number of shots fired by him, the number of miss-fired shots, if any, and the number of cartridges in each shot.

(c) No shot shall be fired in coal unless the coal has been holed to a depth greater than the depth of the shot hole. This provision shall not apply to any anthracite mine or to any mine which may be exempted by the Inspector of the Division on the ground that, by reason of the character of the coal or the inclination of the seam, holing would be impracticable or dangerous.

(d) Every shot shall be charged and stemmed by or under the supervision of a shotfirer. Before the hole is charged a shotfirer shall examine it for breaks running along or across, and if any such break is found the hole shall not be charged, except in stone drifts if special permission has been given in writing by the manager or under-manager.

(e) No cartridge shall be used unless it is marked in the manner set forth in the Third Schedule hereto in addition to any marks required by the First or Second Schedule hereto.

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\* As amended by the Explosives in Coal Mines Order of the 1st September, 1924 (S.R. & O., 1924, No. 1016).

† A list of the Schools, Institutions and Authorities approved for the purpose of granting certificates to shotfirers under this clause is printed on pages 159-160.

‡ The prescribed form of book is Mines and Quarries Form No. 52.

†(f)—(i) No shot shall be fired unless, immediately before the shot is to be fired, the shotfirer has examined with a locked flame safety lamp of approved type or with other apparatus approved\* for the purpose by the Board of Trade the place where the shot is to be fired and all contiguous accessible places within a radius of 20 yards from the place, and has found them clear of inflammable gas and in all respects safe for firing. This examination shall include an examination for any inflammable gas issuing from the shot hole or from any break within the aforesaid radius. If within the aforesaid radius of the place there is any cavity which may contain inflammable gas and cannot be so examined, or any break where an examination cannot be made for inflammable gas issuing from it (other than inaccessible cavities or breaks in the gob, goaf or waste) the shot shall not be fired.

Provided that these requirements shall not apply to mines in which inflammable gas is unknown.

(ii) No shot shall be fired until the place where the shot is to be fired and the floor, roof and sides of all contiguous accessible places within a radius of 5 yards from the place where the shot is to be fired have been thoroughly treated with incombustible dust or with water, or in such other manner as the Board of Trade may approve. If the place where the shot is to be fired is in or near the coal face and not more than 10 yards from a road which has been so treated under the General Regulations of 30th July, 1920, the treatment shall in addition be made continuous from the road to the shot hole.

Provided that if the manager or under-manager has satisfied himself as regards any part of the mine that the natural conditions for the time being in respect of the presence of incombustible dust and moisture render any coal dust harmless, he may give to the shotfirers concerned special permission in writing to dispense with the foregoing precaution in that part of the mine. A copy of every such permission shall be posted at the pithead and a copy shall be forwarded to the Inspector of the Division at least 7 clear days before the permission becomes operative. If at any time any question arises under this proviso as to whether the natural conditions of any part of a mine render any coal dust harmless, the decision of the Inspector of the Division shall be final, subject to an appeal to the Chief Inspector of Mines; and pending the settlement of the question no permission given in pursuance of this proviso in respect of that part of the mine shall become or continue operative without the consent of the Inspector of the Division.

†(g)—(i) Two or more shots shall not be fired in the same place simultaneously, and the precautions prescribed by paragraph f (i) of this Clause shall be taken immediately before the firing of each shot.

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\* No other apparatus has up to the present been approved.

† As amended by the Explosives in Coal Mines Order of the 1st September, 1924 (S.R. & O., 1924, No. 1016).



(ii) If two or more shot holes have been placed in such a manner that the firing of one shot would be liable to relieve any part of the work to be done by another shot, each shot to be fired shall be fired before any other of the shot holes is charged.

(iii) Where in any longwall face shots to bring down the coal are fired between shifts, the foregoing requirement as to the charging of shot holes shall not apply if and in so far as its observance would necessitate the firing of any such shot during a working shift.

(iv) The requirements of this paragraph shall not apply in driving stone drifts or in sinking pits: provided that the precautions prescribed by paragraph *f* (i) of this Clause shall be taken immediately before the firing of each round of shots: provided also that in stone drifts the number of shots which may be fired simultaneously shall not exceed three unless fired electrically in series.

(h) No shot shall be fired except by means of an efficient magneto-electrical apparatus so enclosed as to afford reasonable security against the ignition of inflammable gas.

(i) Each explosive shall be used in the manner and subject to the conditions prescribed in the Schedules hereto.

\*(j) No detonator shall be used other than an electric detonator in which the explosive is contained in a copper capsule.

7. In the main haulage roads and main intake airways and any place immediately contiguous thereto in any coal mine which is not naturally wet throughout—

(a) No explosive shall be used other than a permitted explosive as hereinafter defined, and in accordance with the conditions prescribed by Clause 6 of this Order;

(b) No shot shall be fired without the special permission in writing of the manager or under-manager;

(c) No shot shall be fired unless the workmen have been removed from the seam in which the shot is to be fired and from all seams communicating with the shaft on the same level, except the men engaged in firing the shot and in addition such other persons, not exceeding the number hereinafter specified, as are necessarily employed in attending to the ventilating furnaces, steam boilers, engines, machinery, winding or ventilating apparatus, signals or horses, or in inspecting the mine;

In mines in which the total number of persons employed below ground does not exceed 500 ..	10
In mines in which the total number of persons employed below ground does not exceed 1,000..	20
In mines in which the total number of persons employed below ground exceeds 1,000.. ..	30

Provided that in mines where mechanical power or gravity is used for the purpose of hauling mineral from the face, and the

\* This paragraph was added by the Explosives in Coal Mines Order of the 10th November, 1926 (S.R. & O., 1926, No. 1404).

movement of the strata renders it necessary to maintain the height of the roads by ripping, the foregoing provision relating to the removal of workmen shall not apply to men who may remain in the mine for the purpose of carrying on the ripping within such distance of the face as may be fixed by the manager with the approval of the Inspector of the Division, or for the purpose of repairs.

### PART III.

#### SUPPLEMENTAL.

8. The foregoing provisions shall apply in the case of sinking operations with the following additions:—

(a) No explosive shall be taken or sent into the shaft until immediately before it is required for use.

(b) No shot shall be fired except by means of an efficient magneto-electrical apparatus.

(c) The firing cable shall not be coupled up to the fuze or detonator wires until the kettle, kibble, tub, bowk or hoppet is conveniently placed for the men in the shaft to enter, and the chargeman has received a signal from the surface that the engineman is ready to draw away on receipt of the signal to do so, and the cable shall not be coupled to the firing apparatus until all persons are in a place of safety.

(d) After a shot has been fired the chargeman shall not allow any person to descend until he has descended, accompanied if necessary by not more than two other persons, and has examined the place and found it to be safe in all respects. If the place is one in which inflammable gas has been found or is likely to be found, the examination shall be made with a locked safety lamp of a type which will indicate the presence of such gas.

9. Where a mine contains separate seams, this Order shall apply to each seam as if it were a separate mine.

10. A copy of this Order (with the exception of the First, Second and Third Schedules) shall be supplied to every shotfirer and shall also be kept posted up in some conspicuous place at or near the mine where it may be conveniently read or seen by the persons employed.\*

11. In this Order—

The term "permitted explosives" means (a) the explosives named and defined in the First Schedule† hereto, and (b) for a period of five years from 1st January, 1914, the non-detonating explosives named and defined in the Second Schedule‡ hereto.

‡ Provided that the use of the explosives named and defined in the Second Schedule† is permitted only for the purpose of bringing

\* The official edition in poster form of the Explosives in Coal Mines Order is Mines and Quarries Form No. 34.

† The First and Second Schedules have been omitted. For list of Permitted Explosives corrected to January 31st, 1927, see pages 77 and 78.

‡ As amended by the Explosives in Coal Mines Order of the 18th September, 1918. (S.R. & O., 1918, No. 1197.)

down coal (whether by shots placed in the coal or by shots placed in the stratum immediately above or below the coal) and only in the following class of mines, that is, mines which are not liable to blowers or sudden outbursts of firedamp and in which firedamp does not exist in the coal at a pressure which makes the use of such explosives dangerous and in which the dust on the floor, roof and sides of the roads and at the faces is either naturally so largely composed of incombustible matter as not to be dangerous or has been rendered so by artificial means. If any question arises as to whether a mine is a mine of the aforesaid class or not, the decision of the Inspector of the Division shall be final, subject to an appeal to the Chief Inspector of Mines.

Provided further, as regards the explosives named and described in either the First or the Second Schedule,† that where the composition, quality or character of any explosive is defined in those Schedules, any article alleged to be such explosive which differs therefrom in composition, quality or character whether by reason of deterioration or otherwise, shall not be deemed to be the explosive so defined; but an owner, agent or manager shall not be responsible for the composition, quality or character of an explosive, if he shows that he has in good faith obtained a written certificate from the maker of the explosive that it complies with the terms of the Schedules, and that he has taken all reasonable means to prevent deterioration of the explosive while stored.

The term "coal mine" includes mines in which coal is found, whether worked or not.

The term "road" includes all roads of any description extending from the shaft or outlet to within 10 yards of the coal face.

The term "main haulage road" means a road which has been, or for the time being is, in use for moving tubs by gravity or by mechanical power.

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First Schedule } omitted.†  
Second Schedule }

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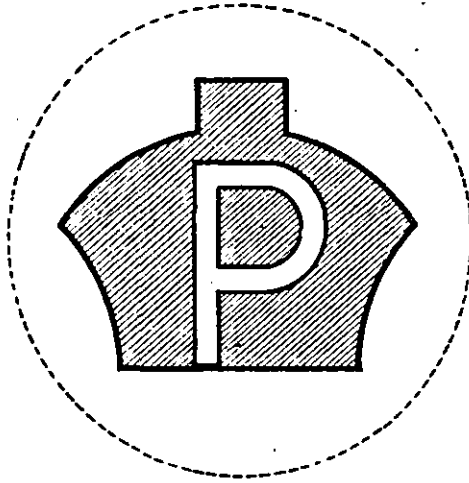
### THIRD SCHEDULE.

Each cartridge, in addition to any marking required in the First or Second Schedule to this Order, shall also be marked with the outline of a Crown with the letter P in the centre, as shown below. In the case of compressed cartridges, which are

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† The First and Second Schedules have been omitted. For list of Permitted Explosives corrected to January 31st, 1927, see pages 77 and 78.

not contained in a wrapper of paper or metal, the outline of the Crown must be indented on the end of the pellet.




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#### FOURTH SCHEDULE.

The fuze shall consist of a core of gunpowder, protected by not less than three coverings of thread or by not less than two coverings of thread and one of tape or gutta-percha. The fuze shall be of such quality that the time of burning of the fuze shall not vary more than 10 seconds above or below the rate of 90 seconds for every yard of fuze. The fuze shall be ignited by means of an igniter contained in a tube which when attached to the fuze forms a completely closed chamber or, in the case of a mine or part of a mine in which the use of safety lamps is not required, the fuze may be ignited by means of a naked light, subject to the conditions that in such mine or part of a mine no person while charging a shot hole or handling any explosive not contained in a securely closed case or canister shall smoke or allow any naked light to be within a distance of 4 feet of the shot hole or explosive, and before a light is brought near to the hole for the purpose of firing the shot all other explosive shall be removed from the neighbourhood of the shot hole.

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#### FIFTH SCHEDULE.

(a) A squib consisting of a tube of paper or other suitable material, coated externally with a solution of silicate of soda or other suitable solution, which will keep it in shape, protect it from damp and prevent it from smouldering, filled with gunpowder and having one end closed by a plug and the other end closed by being twisted, such twisted end being coated with sulphur or treated with saltpetre.

(b) The Brock Squib, consisting of a tapering tube of non-smouldering paper, the larger end of this tube being filled with slow-burning fuze composition and coloured yellow to denote the end to be ignited; the smaller end being fitted with a length of quickmatch reaching to the fuze composition and secured in position by crimping the paper case.

Provided that in every case the squib shall have been manufactured at an explosive factory licensed by the Secretary of State and that the time of burning of the squib when tested at the factory (which test whenever so required by one of H.M. Inspectors of Explosives shall be carried out by, or in the presence of, such Inspector) shall not vary more than 15 seconds above or below 75 seconds.

### List of Permitted Explosives.

The following is a list, corrected to 31st January, 1927, of the Permitted Explosives named and defined in the Schedules to the various Explosives in Coal Mines Orders, together with the date of the Order containing the definition of the explosive, and specifying the greatest weight of the explosive which may be used in any one shot hole.

#### PART I.

*(Explosives which have passed the Rotherham Test.)*

See Appendix II, page 127.

Explosive.	Date of Order.	Permissible maximum charge in ozs.
Ammodyne† .. .. .	14 July, 1926 .. .. .	18
Ammonite .. .. .	14 November, 1919 .. .. .	18
Ammonite No. 1 .. .. .	22 July, 1922 .. .. .	20
Ammonite No. 1 P .. .. .	23 September, 1925 .. .. .	20
Ammonite No. 5 .. .. .	14 November, 1919 .. .. .	26
Antifrost Penrhyn Powder .. .. .	7 January, 1927 .. .. .	22
Austral Viking† .. .. .	15 February, 1923 .. .. .	24
A2 Monobel .. .. .	15 February, 1923 .. .. .	22
Bellite No. 1 .. .. .	6 March, 1920 .. .. .	20
Cambrite No. 2 .. .. .	14 November, 1919 .. .. .	24
Cambrite No. 3 .. .. .	29 July, 1924 .. .. .	36
Celadyne .. .. .	27 May, 1924 .. .. .	26
Celmonite .. .. .	12 October, 1922 .. .. .	20
Cleveland Powder .. .. .	23 September, 1925 .. .. .	18
Denaby Powder .. .. .	14 November, 1919 .. .. .	18
Driftex .. .. .	19 January, 1925 .. .. .	32
du Pont Permissible No. 1† .. .. .	14 November, 1919 .. .. .	18
Dynobel No. 2 .. .. .	27 June, 1921 .. .. .	24
Dynobel No. 3 .. .. .	14 November, 1919 .. .. .	18

† Not manufactured in Great Britain.

PART 1—*continued.*

Explosive.	Date of Order.	Permissible maximum charge in ozs.
Dynobel No. 4 .. .. .	14 November, 1919 .. .. .	30
Essex Powder .. .. .	14 November, 1919 .. .. .	38
Eversoft Plastex .. .. .	7 January, 1927 .. .. .	18
Eversoft Tees Powder .. .. .	7 January, 1927 .. .. .	20
Expedite .. .. .	14 November, 1919 .. .. .	32
Expedite No. 2 .. .. .	15 February, 1923 .. .. .	20
Gathurst Powder .. .. .	29 July, 1924 .. .. .	24
Geligdynite† .. .. .	14 July, 1926 .. .. .	12
Hawkite No. 1 .. .. .	27 May, 1924 .. .. .	14
Hawkite No. 2 .. .. .	29 July, 1924 .. .. .	40
Kentite .. .. .	14 November, 1919 .. .. .	18
Ligdynite† .. .. .	14 July, 1926 .. .. .	18
Ligdynite No. 1 .. .. .	30 January, 1926 .. .. .	26
Monobel No. 1 .. .. .	14 November, 1919 .. .. .	10
Negro Powder No. 2 .. .. .	30 January, 1926 .. .. .	38
New Fortex .. .. .	14 November, 1919 .. .. .	10
Oxite No. 1 .. .. .	29 July, 1924 .. .. .	24
Penrhyn Powder .. .. .	19 July, 1923 .. .. .	26
Plastex .. .. .	14 July, 1926 .. .. .	14
Polar Dynobel .. .. .	8 November, 1926 .. .. .	20
Polar Monobel No. 2 .. .. .	19 January, 1925 .. .. .	34
Polar Rex .. .. .	7 January, 1927 .. .. .	20
Polar Saxonite .. .. .	7 January, 1927 .. .. .	20
Polar Super-Cliffite .. .. .	7 January, 1927 .. .. .	20
Polar Thomas Powder .. .. .	8 November, 1926 .. .. .	26
Polar Viking .. .. .	8 November, 1926 .. .. .	22
Rex Powder .. .. .	15 February, 1923 .. .. .	20
Roburite No. 4 .. .. .	31 December, 1921 .. .. .	18
Sabulex .. .. .	16 June, 1925 .. .. .	20
Samsonite No. 3 .. .. .	14 November, 1919 .. .. .	24
Saxonite .. .. .	19 January, 1925 .. .. .	18
Seamex .. .. .	14 November, 1919 .. .. .	36
Stomonal No. 1 .. .. .	14 November, 1919 .. .. .	20
Stomonal No. 2 .. .. .	6 March, 1920 .. .. .	30
Stonobel .. .. .	30 January, 1926 .. .. .	16
Stonobel No. 2 .. .. .	15 February, 1923 .. .. .	18
Super-Ammodynite† .. .. .	14 July, 1926 .. .. .	16
Super-Cliffite No. 2 .. .. .	14 November, 1919 .. .. .	30
Super-Cliffite No. 3 .. .. .	5 October, 1921 .. .. .	22
Super-Excellite No. 3 .. .. .	14 November, 1919 .. .. .	36
Super-Ligdynite† .. .. .	14 July, 1926 .. .. .	32
Super-Rippite .. .. .	14 November, 1919 .. .. .	18
Super-Rippite No. 2 .. .. .	27 June, 1921 .. .. .	26
Tees Powder .. .. .	8 March, 1922 .. .. .	20
Thames Powder .. .. .	6 March, 1920 .. .. .	32
Thames Powder No. 2 .. .. .	14 November, 1919 .. .. .	22
Tyne Powder .. .. .	23 September, 1925 .. .. .	36
Viking Powder No. 1 .. .. .	6 March, 1920 .. .. .	26
Viking Powder No. 2 .. .. .	15 February, 1923 .. .. .	18

## PART 2.—BOBBINITE

(Permitted only for the purpose of bringing down coal in certain mines, and only until 31st December, 1927.)

† Not manufactured in Great Britain.

## Safety Lamps.

LIST, CORRECTED TO 31ST JANUARY, 1927, OF SAFETY LAMPS APPROVED IN PURSUANCE OF SECTION 33 OF THE COAL MINES ACT, 1911, AND DESCRIBED IN THE SCHEDULES TO THE VARIOUS ORDERS MADE UNDER THAT SECTION.

### PART I.

#### *Flame Safety Lamps Approved for General Use.*

Submitted for Test by	Name of Lamp.	Date of Safety Lamps Order containing the Detailed Specification of the Lamp.
1. Ackroyd and Best, Ltd., Morley, Leeds.	Hailwood, Nos. 01, and 01 S.	26 August, 1913; 9 March, 1914; 7 October, 1914; 30 July, 1918; 1 December, 1920; 27 October, 1923.
	Hailwood, No. 01 B ..	26 August, 1913; 9 March, 1914; 7 October, 1914; 30 July, 1918; 13 December, 1919; 1 December, 1920.
	Hailwood, No. 02.	26 August, 1913.
	Hailwood, Nos. O 12 and B 1. Hailwood, Nos. U O 1 and U B 4.	16 March, 1914. 16 March, 1914.
2. Best's Gauzeless Lamp Co., Ltd., Albert Lamp Works, Fleece Lane, Leeds.	Best's Excelsior, No. 1	26 August, 1913; 7 October, 1914.
	Best's Excelsior, No. 2	16 March, 1914.
	Best's Excelsior, No. 3	15 May, 1916.
	Best's Excelsior, No. 4	22 April, 1915.
	Best's Gauzeless, No. 1	24 November, 1924.
3. Commercial Engineering Co., 11, Commercial Street, Birmingham.	J.C.B., No. 19 .. ..	26 August, 1913; 9 March, 1914; 16 November, 1916; 13 December, 1919.
	J C.B., No. 19 F. ..	16 March, 1914; 13 December, 1919.

PART I—*continued.*

Submitted for Test by	Name of Lamp.	Date of Safety Lamps Order containing the Detailed Specification of the Lamp.
4. John Davis and Son (Derby), Ltd., All Saints Works, Derby.	No. 1, Davis-Marsic .. Davis-Marstry .. Davis-Marstry .. No. 2, Davis-Kirkby ..  No. 1B, Davis-Marsty-Loose. No. 5, Davis-Thornley No. 8, Davis-Thornbury. Davis-Marstif .. .. Davis-Jackson .. ..	26 August, 1913; 7 October, 1914; 15 May, 1916; 9 March, 1918; 18 June, 1921; 9 May, 1923.  26 August, 1913; 15 May, 1916.  1 July, 1914. 24 November, 1924.
5. Richard Evans and Co., Ltd., St. Helens.	Haydock Colliery Pattern.	16 March, 1914; 1 December, 1920.
6. Richard Johnson, Clapham and Morris, Ltd., Newton Heath, Manchester.	Nos. 1 and 2 .. .. Nos. 4 and 4A Deflector No. 5 J.C.M. .. ..	} 26 August, 1913.
7. James Laidler and Sons, New Elvet, Durham.	Nos. 1, 1A and 2 .. .. Type L.C. No. 1 .. ..	26 August, 1913; 9 March, 1914. 9 May, 1923.
8. John Mills and Sons, Walkergate, Newcastle-on-Tyne.	J.M.S. No. 1 .. .. N.	} 26 August, 1913; 16 March, 1915.
9. J. H. Naylor, Ltd., Central Brass Works, Wigan.	Bifold Burner Marsaut  Marsaut A and C .. .. Marsaut B and D .. .. Naylor's Protector, Type G. Naylor's Protector, Types H and I. Marsaut F .. .. Marsaut K .. .. Marsaut L .. ..  Mueseler K .. .. Marsaut K B .. .. Mueseler K B .. ..	26 Aug., 1913; 7 Oct., 1914; 16 Mar., 1915; 15 May, 1916; 13 Dec., 1919; 24 Nov., 1924. 26 Aug., 1913; 15 May, 1916; 24 Nov., 1924. 16 Mar., 1914; 15 May, 1916; 16 Nov., 1916; 24 Nov., 1924. 16 March, 1914; 15 May, 1916; 24 Nov., 1924. 1 July, 1914; 15 May, 1916; 24 Nov., 1924. 16 Mar., 1915; 15 May, 1916; 24 Nov., 1924,  1 July, 1914; 15 May, 1916; 24 Nov., 1924.



## PART I—continued.

Submitted for Test by	Name of Lamp.	Date of Safety Lamps Order containing the Detailed Specification of the Lamp.
10. Patterson and Co., 40-44, Trafalgar Street, Newcastle-on-Tyne.	Type A 1 .. ..	26 August, 1913; 9 March, 1914; 1 July, 1914; 9 March, 1918.
	Type A 3 .. ..	26 August, 1913; 9 March, 1914; 1 July, 1914.
	Type A 5 .. ..	9 March, 1918.
	Type B 1 .. ..	26 August, 1913.
	Types B 3 and B 4 .. ..	16 March, 1914; 16 March, 1915.
	Type B 7 .. ..	22 April, 1915; 9 March, 1918.
	Type E 1 .. ..	3 May, 1926.
11. Premier Lamp and Engineering Co., Ltd., Moorfield Works, Whin-gate, Armley, Leeds.	Premier, Nos. 7, 8 and 11.	26 August, 1913; 16 March, 1914; 16 March, 1915; 13 December, 1919; 1 December, 1920; 31 March, 1922.
	Premier Marsaut, No. 12	16 March, 1914; 1 July, 1914; 7 October, 1914; 16 March, 1915; 13 December, 1919.
	Patterson, No. 12 ..	16 March, 1914; 7 October, 1914; 18 June, 1921.
12. Protector Lamp and Lighting Co., Ltd., Eccles, Manchester.	Prestwich Patent Protector.	26 August, 1913; 9 March, 1914.
	No. 176, Oil .. .. Prestwich Patent Protector 08.	26 August, 1913; 9 March, 1914. 15 May, 1916.
13. J. H. Rothwell and Co., Sindsley Works, Swinton, Manchester.	A and C.. ..	26 August, 1913; 7 October, 1914; 15 May, 1916.
	B and E.. ..	26 August, 1913.
	D .. ..	26 August, 1913; 15 May, 1916.
	A 3, B 3, C 3, D 3, and E 3	15 May, 1916.
14. W. E. Teale and Co., Ltd., Swinton, Manchester.	Protector, No. 1 ..	26 August, 1913; 7 October, 1914; 16 March, 1915; 20 April, 1921; 9 May, 1923; 3 May, 1926.

PART I—*continued.*

Submitted for Test by	Name of Lamp.	Date of Safety Lamps Order containing the Detailed Specification of the Lamp.
14. W. E. Teale and Co., Ltd., Swinton, Manchester <i>—contd.</i>	Protector, No. 2 ..	26 August, 1913; 7 October, 1914; 16 March, 1915; 3 May, 1926.
	Standard Bonnetted Marsaut, No. 4	26 August, 1913; 7 October, 1914; 16 March, 1915; 1 December, 1920; 9 May, 1923.
	Protector, No. 3	} 26 August, 1913; 9 May, 1923; 3 May, 1926.
	Standard Deflector Marsaut, No. 5	
	Mueseler or Thornburry, No. 6.	15 May, 1916.
15. E. Thomas and Williams, Ltd., Aberdare.	Cambrian, No. 1 ..	26 August, 1913; 7 October, 1914; 16 March, 1915; 9 March, 1918; 13 December, 1919.
	Cambrian, No. 3 ..	26 August, 1913; 7 October, 1914; 16 March, 1915; 13 December, 1919.
	Cambrian, No. 5 ..	13 December, 1919; 1 December, 1920.
	Cambrian Deflector, No. 15.	26 August, 1913; 13 December, 1919.
	Cambrian, No. 9 ..	1 July, 1914; 15 May, 1916; 9 March, 1918; 13 December, 1919.
	16. Wolf Safety Lamp Co. (Wm. Maurice), Ltd., Star Works, Young Street, Sheffield.	Wolf-Patterson.. ..

## PART II.

*Flame Safety Lamps approved for Special Purposes.**(a) For Use by Officials only.*

Submitted for Test by	Name of Lamp.	Date of Order.
1. Ackroyd and Best, Ltd., Morley, Leeds.	Hailwood, No. 01 A ..	} 26 August, 1913.
	Hailwood, Nos. 06 and F 1.	
2. Best's Gauzeless Lamp Co., Ltd., Albert Lamp Works, Fleece Lane, Leeds.	Hailwood, No. 01 B A..	13 December, 1919.
	Best's "Gauzeless," No. 1 A.	24 November, 1924.

PART II—*continued.*

Submitted for Test by	Name of Lamp.	Date of Order.
3. Commercial Engineering Co., 11, Commercial Street, Birmingham.	J.C.B., Nos. 19 A, 19 FA, and 27 A.	27 October, 1923.
4. John Davis and Son (Derby), Ltd., All Saints Works, Derby.	No. 11, Davis-Beacatorh No. 2, Davis-Kirkby (aluminium). No. 3, Davis-Boss .. No. 6, Davis-Alumthorn No. 7, Davis-Diabl .. No. 3 C, Davis-Bossgy No. 9, Davis-Graybeard No. 10, Davis-Gry .. Davis-Briggs Oxymeter	26 August, 1913; 15 May, 1916; 9 May, 1923. 1 December, 1920. 26 August, 1913; 15 May, 1916; 16 November, 1916; 9 May, 1923. 26 August, 1913. 26 August, 1913. 16 March, 1914. 16 March, 1914; 7 October, 1914. 9 March, 1918.
5. Richard Johnson, Clapham and Morris, Ltd., Newton Heath, Manchester.	No. 3 and No. 6 ..	26 August, 1913.
6. James Laidler and Sons, New Elvet, Durham.	No. 2 A .. ..	26 August, 1913.
7. John Mills and Sons, Walkergate, Newcastle-on-Tyne.	J.M.S. Nos. 2 and 3 .. N.	26 August, 1913.
8. J. H. Naylor, Ltd., Central Brass Works, Wigan.	Bifold Burner Marsaut (for officials). Marsaut A 1 and B 2 .. Marsaut E or E 1 .. Marsaut F 1 .. .. Naylor's Protector, Types G 1, H 1 and I 1. Marsaut K 1 and K B 1 Mueseler K 1 and K B 1 Marsaut L 1 .. ..	26 Aug., 1913; 7 Oct., 1914; 16 Mar., 1915; 15 May, 1916; 24 Nov., 1924. 26 Aug., 1913; 15 May, 1916; 24 Nov., 1924. 26 Aug., 1913; 16 Mar., 1915; 15 May, 1916; 9 Mar., 1918; 24 Nov., 1924. 16 March, 1914; 15 May, 1916; 24 Nov., 1924. 16 March, 1914; 15 May, 1916; 24 Nov., 1924. 1 July, 1914; 15 May, 1916; 24 Nov., 1924. 16 March, 1915; 15 May, 1916; 24 Nov., 1924.

PART II—*continued.*

Submitted for Test by	Name of Lamp.	Date of Order.
9. Patterson and Co., 40-44, Trafalgar Street, New- castle-on-Tyne.	Type A 2 .. ..	26 August, 1913; 9 March, 1918.
	Types A 4 and B 2 ..	26 August, 1913.
	Types B 5 and B 6 ..	16 March, 1914.
	Type B 8 .. ..	15 June, 1915; 9 March, 1918.
	Type D 1 .. ..	26 August, 1913; 16 March, 1914; 16 March, 1915.
	Type D 2 .. ..	16 March, 1914; 9 March, 1918.
	Type E 2 .. .. Type E 3 .. ..	9 March, 1918. 3 May, 1926.
10. Premier Lamp and Engineering Co., Ltd., Moorfield Works, Whin- gate, Armley, Leeds.	Premier, No. 11 A ..	26 August, 1913; 16 March, 1915; 13 De- cember, 1919; 31 March, 1922.
11. Protector Lamp and Lighting Co., Ltd., Eccles, Manchester.	Prestwich Patent Pro- tector, A.	26 August, 1913.
12. J. H. Rothwell and Co., Sindsley Works, Swin- ton, Manchester.	A 1, A 2, C 1, and C 2 ..	7 October, 1914.
13. W. E. Teale and Co., Ltd., Swin- ton, Manchester.	Standard Bonnetted Marsaut, Nos. 4A and 4x.	26 August, 1913; 7 Oc- tober, 1914; 16 March, 1915; 21 September, 1922.
	Teale's Protector, Nos. 1A, 2A, 1x, 2x and 3x.	16 March, 1914; 7 Oc- tober, 1914; 16 March, 1915; 21 September, 1922; 3 May, 1926.
	Mueseler or Thornburry, Nos. 6A and 6x.	15 May, 1916; 21 Sep- tember, 1922.
14. E. Thomas and Williams, Ltd., Aberdare.	Cambrian, No. 1A ..	26 August, 1913; 13 December, 1919.
	Cambrian Improved Fireman's, No. 21.	26 August, 1913; 13 December, 1919.
	Cambrian, No. 7 ..	16 November, 1916; 13 December, 1919.
	Cambrian, No. 29 ..	13 December, 1919.
	Cambrian, No. 30 .. Cambrian Fireman's, No. 25.	9 May, 1923. 13 December, 1919.

## PART II—continued.

(b) *Porch and Roadway Lamps to be used only within Certain Limits.*

Submitted for Test by	Name of Lamp.	Date of Order.
1. Ackroyd and Best, Ltd., Morley, Leeds.	Porch, No. (010) P. ..	16 March, 1914.
2. John Davis and Son (Derby), Ltd., All Saints Works, Derby.	Davis-Porcass .. ..	16 March, 1914.
3. Richard Johnson, Clapham and Morris, Ltd., Newton Heath, Manchester.	No. 7, Deflector Roadway.	1 July, 1914;
4. J. H. Naylor, Ltd., Central Brass Works, Wigan.	Roadways, Nos. 1 and 2	16 March, 1915; 15 May, 1916; 24 November, 1924.
5. Patterson and Co., 40-44, Trafalgar Street, Newcastle-on-Tyne.	Porch, Type F 1. ..	13 December, 1919.

## PART III.

*Electric Safety Lamps approved for General Use.*

Submitted for Test by	Name of Lamp.	Date of Order.
1. Adams Bros. (Longton), Ltd., Baywood Works Sutherland Road, Longton, Staffs.	Adams .. .. .	16 December, 1921.
2. Alkaline Miners' Lamps, Ltd., Victoria Works, Marshgate Lane, Stratford, London, E. 15.	Pearson Ni+Fe ..	20 April, 1921; 21 September, 1922.
	Pearson Ni+Fe (Square)	3 May, 1926.
	Pearson Ni+Fe 5-volt	3 May, 1926.
3. "Ceag" Miners' Supply Co., Ltd., Barnsley.	Ceag .. .. .	26 August, 1913; 9 March, 1914; 16 March, 1915; 16 November, 1916; 9 March, 1918; 16 December, 1921.
	Ceag Cap .. ..	18 June, 1921; 27 October, 1923.
	Ceag Pillarless ..	21 September, 1922.
	Ceag Pillarless No. 2 ..	24 November, 1924.
	Ceag 4-Volt Pillarless ..	24 November, 1924.

PART III—*continued.*

Submitted for Test by	Name of Lamp.	Date of Order.
4. John Davis and Son (Derby), Ltd., All Saints Works, Derby.	Davis-Derby Pillarless	3 May, 1926.
	Davis-Edison Accumulator.	16 November, 1916.
	Derby, Pillared Hand ..	3 May, 1926.
5. Edison Storage Battery Co., Orange, New Jersey, U.S.A.	Edison Cap .. ..	3 May, 1926.
6. Empire Miners' Lamp Co., 1, Buckingham Street, Strand, London, W.C. 2.	Empire .. ..	18 June, 1921.
7. Federation Lamp Co. (Wm. Maurice), StarWorks, Young Street, Sheffield.	Federation .. ..	20 April, 1921.
8. Fuller's United Electric Works, Ltd., Woodland Works, Grove Road, Chadwell Heath, Essex.	Fuller .. ..	3 May, 1926.
9. General Electric Co., Ltd., Witton, Birmingham.	Kingsway No. 2 ..	1 December, 1920.
	Kingsway II Pillarless	27 October, 1923.
10. W. E. Gray, 19, Archer Street, Camden Town, N.W.1.	Gray-Sussmann, No. 3	26 August, 1913; 1 December, 1920.
	Gray-Sussmann, No. 4	26 August, 1913; 1 December, 1920; 27 October, 1923.
	Gray-Sussmann, No. 5	27 October, 1923; 24 November, 1924.
	Gray-Sussmann, No. 6	27 October, 1923.
11. John Mills and Sons, Walkergate, Newcastle-on-Tyne.	Joel-Fors, Type 403M ..	16 March, 1914; 9 March, 1918.
	Joel-Fors, Type 303M ..	9 March, 1918.
12. Oldham and Son, Ltd., Denton, near Manchester.	Oldham .. ..	27 October, 1923.
	Oldham Cap .. ..	20 April, 1921; 3 May, 1926.
	Oldham Pillarless ..	9 May, 1923.

## PART III—continued.

Submitted for Test by	Name of Lamp.	Date of Order.
13. Wm. Paton and Co., Grafton Street, Glasgow.	Beam Cap .. ..	16 December, 1921; 9 May, 1923.
14. Patterson and Co., 40-44, Trafalgar Street, Newcastle-on-Tyne.	Electric, Type G 1 ..	20 April, 1921.
	Electric, Type H 1 ..	21 September, 1922; 27 October, 1923.
	Electric, Type G 1 A ..	27 October, 1923.
	Electric, Cap, Type J 1	3 May, 1926.
15. Premier Lamp and Engineering Co., Ltd., Moorfield Works, Whin-gate, Armley, Leeds.	Electric, Type K 1 ..	3 May, 1926.
	Premier, No. 100 ..	18 June, 1921.
16. J. H. Rothwell and Co., Sindsley Works, Swinton, Manchester.	Rothwell, No. 3 ..	16 March, 1915.
17. Société Belge d'Applications Electrique, La Bouverie, Belgium.	Lemaire.. ..	21 September, 1922.
18. W. E. Teale and Co., Ltd., Swinton, Manchester.	No. 1 Electric ..	15 May, 1916.
19. E. Thomas and Williams, Ltd., Cambrian Lamp Works, Aberdare.	Cambrian Electric Type A	24 November, 1924.
	Cambrian Electric Type B	24 November, 1924.
20. Thor Electric Safety Lamp Co., Ltd., Thor Works, Rea Street South, Birmingham.	Thor .. ..	1 December, 1920; 9 May, 1923.
	Thor Cap .. ..	21 September, 1922.
	Thor Pillarless, S.P. Type.	9 May, 1923.
21. Turquand and Kew, Ltd., Albion House, 59-61, New Oxford Street, W.C.1.	T.K. .. ..	21 September, 1922.
22. Wolf Safety Lamp Co. (Wm. Maurice), Ltd., Star Works, Young Street, Sheffield.	Wolf, Alkaline .. ..	} 26 August, 1913; 20 April, 1921; 21 September, 1922.
	Wolf, Lead .. ..	
	Wolf, No. 2 .. ..	3 May, 1926.
23. Worsnop and Co., Ltd., Lamp Works, Halifax.	Wolf Cap .. ..	3 May, 1926.
	Worsnop .. ..	16 March, 1915.
	Maxilux.. ..	3 May, 1926.

## PART IV.

*Electric Safety Lamps approved for Use by Officials, or for Special Purposes only.*

Submitted for Test by	Name of Lamp.	Date of Order.
1. Alkaline Miners' Lamps, Ltd., Victoria Works, Marshgate Lane, Stratford, London, E.15.	Pearson Ni + Fe Officials' Pocket.	3 May, 1926.
2. "Ceag" Miners' Supply Co., Ltd., Barnsley.	Ceag Bull's Eye Type .. Ceag Bull's Eye, No. 2 Ceag Bull's Eye, No. 3*  Ceag Electric Torch* .. Ceag Shaft and Roadway. Ceag Shaft and Roadway, Type B. Ceag Deputy .. .. Federation Rescue ..	13 December, 1919. 31 March, 1922. 31 March, 1922; 9 May, 1923.  31 March, 1922. 16 December, 1921. 24 November, 1924.  9 May, 1923. 21 September, 1922.
3. Federation Lamp Co. (Wm. Maurice), Star Works, Young Street, Sheffield.		
4. Float Electric Co., Ltd., Adam Street, New Kent Road, London, S.E.1.	Float Patent .. ..	26 August, 1913.
5. Greenwood and Batley, Ltd., 16, Great George Street, London, S.W.1.	Bipol Torch* .. ..	1 December, 1920.
6. John Mills and Sons, Walkergate, Newcastle-on-Tyne.	Joel-Fors Inspection, Type 303 C. Joel-Fors, Type 403 H.	16 March, 1914; 9 March, 1918; 30 July, 1918. 16 March, 1914.
7. Oldham and Son, Ltd., Denton, near Manchester.	Oldham Emergency .. ..  Oldham Emergency Type No. 2, Bull's Eye.  Oldham Type R 1, Shaft and Roadway. Oldham Colliery Officials' Safety Torch.* Oldham No. 3 Hooded Oldham Electric Torch	26 August, 1913; 16 November, 1916; 30 July, 1918.  15 June, 1915; 16 November, 1916; 30 July, 1918.  1 December, 1920; 27 October, 1923. 1 December, 1920.  9 May, 1923.
8. Patterson and Co., 40-44, Trafalgar Street, Newcastle-on-Tyne.	Electric, Type H 2 .. ..	24 November, 1924. . 21 September, 1922; 27 October, 1923.

\* This lamp is only to be used in conjunction with another safety lamp of approved type, capable of giving the required candle-power for the required number of hours.



PART IV—*continued.*

Submitted for Test by	Name of Lamp.	Date of Order.
9. Siebe, Gorman and Co., Ltd., 187, Westminster Bridge Road, London, S.E. 1.	Siebe Gorman, Type No. 1.	18 June, 1921.
10. Thor Electric Safety Lamp Co., Ltd., Thor Works, Rea Street South, Birmingham.	Thor Bull's Eye .. Pocket Emergency Thor* Thor Shaft and Roadway, Type M.	1 December, 1920. 1 December, 1920. 16 December, 1921.
11. Watts, Fincham and Co., Ltd., 40, Willow Walk, Bermondsey, S.E.1.	Wefco .. .. .	31 March, 1922; 21 September, 1922.
12. Wolf Safety Lamp Co. (Wm. Maurice), Ltd., Star Works, Young Street, Sheffield.	Wolf Rescue, No. 2 .. Wolf Nickel-Cadmium Inspection, No. 608. Wolf Alkaline, No. 966* Wolf Alkaline, No. 969*	16 March, 1914; 20 April, 1921; 21 September, 1922. 9 May, 1923. 24 November, 1924. 24 November, 1924.

## PART V.

LAMPS WHICH ARE NO LONGER MADE BY THE ORIGINAL MANUFACTURERS.

(a) *Flame Safety Lamps for General Use.*

Submitted for Test by	Name of Lamp.
Best's Safety Lamps, Ltd. .. ..	Best's Excelsior, Nos. 1, 2, 3 and 4. Best's Gauzeless, No. 1.
Joseph Cooke and Son .. ..	J.C.B., Nos. 19, 19F and 22.
Cremer Lamp and Engineering Co., Ltd.	Cremer, No. 11. Cremer Marsaut, No. 12.
M. Lowrance and Son .. ..	Hickleton Main Colliery Pattern (H.M.C.). Monk Bretton Colliery Pattern (M.B.C.). M.L. and S.
J. H. Naylor .. .. .	Bifold Burner Marsaut. Marsaut, A, B, C, D, F, K, KB and L. Mueseler, K and KB. Naylor's Protector, Types G, H, and I.
Wölf Safety Lamp Co., Ltd., or Baxendale and Co.	Patterson No. 12.
Wolf Safety Lamp Co., Ltd. ..	Wolf No. 7 and Wolf-Patterson.

\* This lamp is only to be used in conjunction with another safety lamp of approved type, capable of giving the required candle-power for the required number of hours.

PART V—*continued.**(b) Flame Safety Lamps for Use by Officials only.*

Submitted for Test by	Name of Lamp.
Best's Safety Lamps, Ltd. .. ..	Best's Gauzeless, No. 1A.
Joseph Cooke and Son .. ..	J.C.B., Nos. 19A, 19FA, 22A and 27A.
Cremer Lamp and Engineering Co., Ltd.	Cremer, No. 11A.
J. H. Naylor .. .. .	Bifold Burner Marsaut (for Officials) Marsaut, A1, B2, E, E1, F1, K1, KB1 and L1. Mueseler, K1 and KB1. Naylor's Protector, Types G1, H1, and I1.

*(c) Flame Porch and Roadway Lamps to be used only within Certain Limits*

J. H. Naylor .. .. .	Roadway, Nos. 1 and 2.
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*(d) Electric Safety Lamps for General Use.*

Bristol Electric Safety Lamp Works	Bristol Type B.T. 4 V.
General Electric Co., Ltd. .. ..	Kingsway. Angold-Kingsway. Pearson.
Pearson's Electric Miners' Lamp Co., Ltd.	
Wolf Safety Lamp Co., Ltd. ..	Wolf Alkaline, Wolf Lead and Wolf No. 2.

*(e) Electric Safety Lamps for Special Purposes only.*

Bristol Electric Safety Lamp Works	Bristol, Type B.R. 4 V.
Oldham and Son, Ltd. .. ..	Oldham Shaft and Roadway, Types A and B.
Pearson's Electric Miners' Lamp Co., Ltd.	Officials' Pocket Lamp.
Wolf Safety Lamp Co., Ltd. ..	Wolf Rescue, No. 2.

### Safety Lamp Glasses.

THE SAFETY LAMPS GLASSES ORDER OF THE 25TH OCTOBER, 1918.

1918. No. 1419. (As amended 29th March, 1919 (S.R. & O., 1919, No. 433).)

1. Glasses manufactured by the Manufacturers named in the Schedule to this Order and bearing the Manufacturer's Trade Mark as reproduced in the Schedule are approved, until further Order, for use in any flame safety lamp of approved type. The approval is subject in each case to the conditions set out in the Schedule and to any condition specified in the official description of the lamp in which the glass is to be used.
2. All provisions relating to the approval of safety lamp glasses contained in previous Orders under Section 33 of the Act, and the Order of 6th November, 1914,\* made under the same section allowing temporarily the use of unapproved glasses, are hereby revoked.

Provided that unapproved glasses which are at present in use may continue to be used until the 31st March, 1919, if they comply with the requirements as regards dimensions and otherwise specified in the official description of the lamp in which they are used.

Provided further that glasses manufactured in the United Kingdom prior to 25th October, 1918, and complying with the requirements of this Order in all respects except that they bear a trade mark approved under previous Orders made under Section 33 of the Act but not under this Order, may be used until further order.

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LIST, CORRECTED TO 31ST JANUARY, 1927, OF SAFETY LAMP GLASSES APPROVED IN PURSUANCE OF SECTION 33 OF THE COAL MINES ACT, 1911, AND DESCRIBED IN THE SCHEDULES TO THE VARIOUS SAFETY LAMP GLASSES ORDERS MADE UNDER THAT SECTION.

#### *Conditions of Approval.*

In each case the approval is subject to the following conditions, in addition to any conditions specified in the official description of the lamp in which the glass is to be used:—

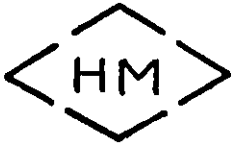

- (a) That in addition to bearing the Trade Mark each glass is marked to show its size, either (i) by a numeral


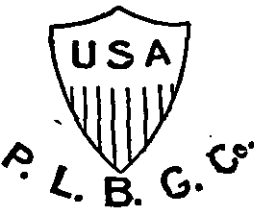

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\* S.R. and O., 1914, No. 1632.

following a lampmaker's initials as specified in the official description of the lamp in which the glass is to be used, or (ii) by numerals giving the maximum external diameter and mean height of the size (the former to be placed first).

- (b) That in any size of glass the variations in external diameter and height do not exceed  $+ 0 \text{ mm.}$  and  $- 1 \text{ mm.}$  and  $\pm \frac{1}{4} \text{ mm.}$  respectively, and that in any one glass the variation in thickness does not exceed 1 mm.
- (c) That the ends of the glasses are not out of parallel to an extent of more than  $\frac{1}{4} \text{ mm.}$
- (d) That the glasses are of the same composition and quality as the samples officially tested.

MANUFACTURER	TRADE MARK OF GLASS.	DATE OF ORDER.
1. Ackroyd and Best, Ltd., Morley, near Leeds.	<p style="text-align: center;">"HAILUXO"</p> 	25 Oct., 1918.  21 Sept., 1923.
2. Butterworth Brothers, Ltd., Newton Heath, Manchester.		25 Oct., 1918.
3. Gebrüder Putzler, G.m.b.H., Penzig, Silesia, Germany, (Agents, Johnsen & Jorgensen Flint Glass, Limited, 26 & 27, Farringdon Street, London, E.C.4.)	<p style="text-align: center;">INDIFFERENT.</p>	19 Oct., 1925.
4. Macbeth-Evans Glass Company, Pittsburgh, U.S.A.	<p style="text-align: center;"><b>MACBETH</b> <b>No. 2100</b> <b>HIGH SPEED.</b></p>	25 Oct., 1918.

MANUFACTURER.	TRADE MARK OF GLASS.	DATE OF ORDER.
5. John Moncrieff, Ltd., Perth.		25 Oct., 1918.
6. Pittsburgh Lamp, Brass and Glass Company, Pitts- burgh, U.S.A.		25 Oct., 1918.
7. S. Reich & Co., Vsetin, Czechoslovakia. (Agent, V. Birn- baum, 53, Lan- caster Road, Lon- don, N.W.3.)	<p>"SUPERVITRIC."</p>	30 June, 1926.
8. Stevens and Williams, Ltd., Brierley Hill, near Stourbridge.		25 Oct., 1918.
9. F. H. Thompson, 26, Sandhill, New- castle - on - Tyne, Agent for Société Anonyme Val St. Lambert, Val St. Lambert, Belgium.	<p>D.S. 4 VAL ST. LAMBERT</p>	21 Sept., 1923.

### Certificates of Competency for Managers and Under-Managers.

1. ORDER MADE BY THE BOARD FOR MINING EXAMINATIONS, AND APPROVED BY THE SECRETARY OF STATE, FEBRUARY 19, 1915, FIXING THE TIMES AND PLACES FOR HOLDING EXAMINATIONS FOR CERTIFICATES OF COMPETENCY AND FOR SURVEYORS' CERTIFICATES.

1915. No. 181.

(1.) Two examinations shall be held in each year in the last complete week of May and in the last complete week of November respectively.

(2.) Each examination shall be held simultaneously at the following centres :—

<i>District.</i>	<i>Centre of Examination.</i>
1. Scotland .. .. .	Edinburgh.
2. Northumberland, Durham, Yorkshire (N. Riding), Cumberland and West- morland .. .. .	Newcastle.
3. York and North Midland .. .. .	Sheffield.
4. Lancashire, North Wales, Cheshire, <i>and Ireland*</i> .. .. .	Wigan.
5. South Wales and Monmouth .. .. .	Cardiff.
6. Midland and Southern .. .. .	Birmingham.

(3.) The previous Order, dated 1st August, 1912, is hereby revoked.

*R. A. S. Redmayne,*  
Chairman of the Board.

19th February, 1915.

I hereby approve the foregoing Order.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
19th February, 1915.

2. RULES MADE BY THE BOARD FOR MINING EXAMINATIONS, AND APPROVED BY THE SECRETARY OF STATE, AUGUST 1, 1912, FOR THE CONDUCT OF EXAMINATIONS.

*Dated July 30, 1912. (S.R. & O., 1912. No. 1150.)*

As amended 18th March, 1914 (S.R. & O., 1914, No. 402).

(1.) One of the Central Examiners, and at least one Local Examiner possessing practical acquaintance with the local mining conditions, shall be in attendance at each examination centre. The Central Examiner shall take the chief control of the examination, and subject to the regulations of the Board, the local Examiner or Examiners shall act in accordance with the instructions of the Central Examiner.

The local Examiners shall not concern themselves in any way with the written part of the examination, but shall assist the

\* In consequence of Orders in Council issued under the Government of Ireland Act, 1920, and the Irish Free State (Agreement) Act, 1932 Ireland ceased to be part of No. 4 District as from 1st April, 1922.

Central Examiners in carrying out the *visd voce* examination of candidates.

(2.) Invigilators shall be appointed for each examination not exceeding one for every 50 candidates, who shall act under the orders of the Central Examiner and assist him in maintaining discipline and in distributing the questions and collecting the examination papers.

(3.) Examiners shall see that the walls of the room are cleared of all possible aids to the candidates under examination.

(4.) All stationery, &c., required for the purpose of the examination shall be obtained by the Secretary to the Board and supplied to the Examiners. All surplus stationery must be returned to the Secretary to the Board at the close of the examination.

Each candidate shall be provided with pens, ink, and blotting paper.

(5.) The papers are to be set in the order indicated by a Time Table prepared jointly by the Central Examiners.

If from any cause a paper is not given out precisely at the scheduled time the candidates must be informed of the fact, and the exact time at which their work will be collected, and care must be taken that the exact full time is allowed from the moment at which the paper was given out. The time consumed in giving out and collecting papers must not be included in the "full time" allowed for any paper.

(A candidate who attends late shall not be allowed any extension of time on that account.)

\*(6.) Before proceeding to his seat in the examination room a candidate must lay aside his hat, overcoat, umbrella, and any book, papers or appliances, the use of which is not expressly allowed to him. The candidate shall be allowed to bring with him a drawing scale, slide rule, protractor, a pair of compasses, parallel rule and set squares. Apart from such special articles, a candidate shall be at liberty to take to his place in the examination room such ordinary appliances as pens, ink, penknife, chalks and indiarubber; but the examiner may at his discretion prohibit the use of any such articles.

If a candidate comes late he shall be warned that his marks may be disallowed for that subject, but he shall not be excluded from the examination. A note of the circumstances must be made, and it must always be stated whether any other candidate has already left the room.

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\* As amended by the Order of the 18th March, 1914 (S.R. & O., 1914, No. 402).

(7.) The Examiners shall collect at the commencement of the examination from each candidate the Home Office authorisation for appearing at the examination.

(8.) The candidates shall be told not to begin work on a paper until they receive the signal to do so.

(9.) The Examiner must take every precaution that no candidate receives any improper assistance either from books or papers or from any other candidate. He must insist upon perfect silence in the examination room ; check all disorderly or improper conduct in or about the room, enforce all the rules for the conduct of examinations and report to the Board any irregularity which may occur, or any shortcoming in the arrangements for the examination.

(10.) No candidate shall be allowed to quit the examination room until the expiration of half an hour from the time fixed for the commencement of the paper on which he is engaged.

A candidate who is obliged to leave the room through illness or other sufficient cause, and who wishes to return and continue work on the paper then in progress, shall leave the room in charge of an attendant ; a note as to the circumstances shall be made and the page of the book on which the candidate was at work shall be endorsed " The candidate left at this point."

In certain cases (*e.g.*, oral and practical examinations) candidates may be required to remain in the room until the expiration of the time allotted to the subject. Candidates shall not, without the express permission of the Central Examiner, remove from the examination room any paper or other material supplied to them, other than the printed papers of questions which the candidate may take away with him at the conclusion of the examination.

(11.) A candidate who asks a question as to any ambiguity in the papers, shall be told to enter on his work any representation he may wish to make, but no further answer shall be given. The Examiner shall himself forward an independent report to the Board, stating the candidate's name and the general nature of the question. A candidate making a complaint of any other nature shall be directed to make his statement in writing, which shall, if the Examiner thinks necessary, be sent to the Board.

(12.) Candidates shall be allowed, unless there is any special direction to the contrary, to keep their work in any subject until the expiration of the time allotted.



Every book, plan, form, or separate sheet of paper used by the candidate must have the candidate's correct name written upon it.

(13.) All examination papers shall be forwarded in a sealed package to the Secretary to the Board, after they have been examined and the marks tabulated by the Examiners.

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3. RULES MADE BY THE BOARD FOR MINING EXAMINATIONS,  
AS TO THE QUALIFICATIONS OF APPLICANTS FOR FIRST AND  
SECOND CLASS CERTIFICATES OF COMPETENCY.\*

(a) *Dated December 23rd, 1926.*

1926. No. 1738.

In pursuance of Section 9 (2) of the Coal Mines Act, 1911, the Board for Mining Examinations, with the approval of the Board of Trade, hereby make the following Rules for the qualifications of applicants for Certificates of Competency under the said Act:—

1. An applicant for a First Class or Second Class Certificate of Competency must be at least 23 years of age on the first day of Examination, and must submit to the Board for Mining Examinations (hereinafter called the Examining Board) testimonials and certificates of his preliminary qualifications as follows:—

- (i) Satisfactory testimonials, on forms provided for the purpose, as to sobriety and general good conduct ;
- (ii) First Aid Certificate of the St. John Ambulance Association or of the St. Andrew's Ambulance Association or other Society or Body approved by the Board of Trade†; and
- (iii) Fireman's Certificate as required under Section 15 (1) (b) of the Coal Mines Act, 1911.

2. Save as is hereinafter expressly provided, an applicant must satisfy the Examining Board that he has had practical experience in mining at the working face and other parts of the underground workings for not less than 5 years (or not less than 3 years if he holds a Degree or Diploma which has been approved by the Board of Trade‡ for the purposes of Section 9 (2) of the Coal Mines

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\* For Rules as to Qualifications of Applicants who have served in H.M. Forces for the purposes of the late War, *see* page 101.

† For List of Approved Bodies, *see* page 151.

‡ A list of the approved institutions and the degrees or diplomas in respect of which they are approved is printed in Appendix VIII, page 153.

Act, 1911); provided that, for at least 2 years (or at least 1 year 6 months if he holds an approved Degree or Diploma), such experience shall have been obtained in the performance or responsible control of stonework, timbering, repairing, and of either the getting of minerals (by hand or machinery) or any work directly connected with such getting at the face of the mine.

The required experience shall have been obtained either in Great Britain in a mine or mines under the Coal Mines Act, 1911, or partly therein and partly elsewhere in such coal mine or coal mines, as may, in the opinion of the Examining Board, provide equivalent experience.

3. For a First Class Certificate, an applicant must satisfy the Examiners in knowledge of fiery mines and must possess such a knowledge of arithmetic, mathematics, physics (including electricity), chemistry, geology, and engineering science as will enable him to pass a written Examination on the subjects in the following syllabus :—

(i) *Winning and Working*.—Systems of laying out and working, under varying circumstances, of coal and other stratified deposits included under the Coal Mines Act. The geology of these deposits. Methods of supporting roof and sides. Boring and sinking. Blasting and general knowledge of explosives.

(ii) *Theory and Practice of Ventilation*.—The properties, identification and practical estimation of gases met with in mines. Sources and effects of heat in mines. Natural ventilation, fans and other ventilators. The distribution and control of the air underground. Construction, use and testing of safety lamps.

(iii) *Explosions in Mines, Underground Fires and Inundations, their Causes and Prevention*.—Coal-dust. Spontaneous heating. Rescue operations, apparatus and organisation. Recovery of mines after explosions, fires and inundations.

(iv) *Machinery*.—Winding, hauling, pumping, mechanical coal-cutting and conveyors, &c. Methods of transmission of power. Strength of materials.

(v) *Surveying, Levelling and Drawing*.—Determination of magnetic declination. Loose and fast needle dialling. Calculation of areas and volumes. Contour lines and levelling. Traversing with the theodolite underground and on the surface. Connecting of surface and underground surveys. Triangulation. Mine plans and sections. The use, care and testing of instruments.

Each candidate must produce a plan of a Mine Survey and a section prepared from an underground levelling made and drawn by himself with the original plottings and the notes from which the plottings have been made, and the work must be certified by him as having been carried out by himself. The plan and section prepared from an underground levelling must have been made and drawn not more than twelve months before the date of the examination.

(vi) *General Management and Mining Legislation.*— Organisation and surface arrangements under varying circumstances. Mines Acts. General and special regulations or orders and other legislation applicable to mines under the Coal Mines Act.

4. An applicant for a Second Class Certificate will be required to pass a written Examination on the undermentioned subjects in which the questions set shall be of a nature suitable for practical working miners :

(i) Systems of laying out and working, under varying circumstances, of coal and other stratified deposits included under the Coal Mines Act. Methods of supporting roof and sides. Boring against old workings. Shot firing.

(ii) Ventilation, the properties, identification and practical estimation of gases met with in mines. Natural ventilation, fans and other ventilators. The distribution and control of the air underground. Construction, use and testing of safety lamps.

(iii) Explosions in mines, underground fires and inundations, their causes and prevention. Coal-dust. Spontaneous heating. Rescue operations, apparatus and organisation.

(iv) Machinery and plant in common use in a colliery, including the use of electricity, and with special reference to safety.

(v) Arithmetic (simple rules). Elementary surveying and levelling.

(vi) Mines Acts. General and special regulations and orders. Writing of reports.

5. In addition to the written examination mentioned in the two last preceding Rules, an applicant for either class of Certificate will be required to pass an oral examination designed to test

100 CERTIFICATES OF COMPETENCY:—QUALIFICATIONS OF APPLICANTS.

his detailed knowledge of practical methods of mining in the District in which he is examined.

6. An applicant shall not be deemed to have passed the prescribed Examination unless he shall obtain (a) at least 40% of the maximum marks for each paper (6 subjects), (b) at least 40% of the maximum marks for the oral examination and (c) at least 60% of the maximum marks for the whole Examination (written and oral).

The maximum marks for a First Class Certificate shall be as follows:—

Subject 1.	Winning and working.. ..	250
„ 2.	Theory and practice of ventilation	200
„ 3.	Explosions in mines, underground fires and inundations .. ..	130
„ 4.	Machinery .. ..	150
„ 5.	Surveying, levelling and drawing ..	140
„ 6.	General management and mining legislation .. ..	130
	Oral Examination .. ..	300
		300
	Total .. ..	1,300
		1,300

The maximum marks for a Second Class Certificate shall be as follows:—

Subject 1.	Systems of laying out and working coal, &c. .. ..	300
„ 2.	Ventilation .. ..	300
„ 3.	Explosions in mines, underground fires and inundations .. ..	100
„ 4.	Machinery .. ..	100
„ 5.	Arithmetic and elementary survey- ing and levelling .. ..	100
„ 6.	Mines Acts, general and special reg- ulations, &c. .. ..	100
	Oral examination .. ..	400
		400
	Total .. ..	1,400
		1,400

7. The Rules made by the Board for Mining Examinations on the 20th day of August, 1919,\* and approved on the 29th day of August, 1919, are hereby revoked, provided that any applicant who was qualified to sit and duly sat at any examination for First Class or Second Class Certificates of Competency held prior to the date of these Rules coming into force shall be deemed to have satisfied the requirements of Rule 2 of these Rules.

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\* S.R. & O., 1919 No. 1291.

8. These Rules may be cited as the Mining Examinations (Qualifications for Certificates of Competency) Rules 1926, and shall come into operation on the 1st day of March, 1927.

*R. A. S. Redmayne,*  
Chairman of the Board for Mining Examinations.

Dated this 23rd day of December, 1926.

I hereby approve the foregoing Rules.

*P. Cunliffe-Lister,*  
President of the Board of Trade.

(b) Dated January 24, 1917. (S.R. & O., 1917, No. 126.)

As amended 24th December, 1917. (S.R. & O., 1917, No. 1351.)

In the case of a candidate who has served in any of His Majesty's Forces for the purposes of the present War for a period of at least one year and who before such service had had practical experience in mining the following modifications of Section 9 (2) (b) of the Coal Mines Act, 1911, and of the Rules made by the Board for Mining Examinations on the 30th July, 1912, shall apply :—

1. The candidate shall have had such practical experience in mining as is required by No. 3\* of the above-mentioned Rules for a period of not less than three years, or (in the case of a candidate who has received an approved diploma or taken an approved degree) of not less than two years provided :—

†(1) that at least one and a half years of such practical experience must have been gained either—

(a) in actual practical work (*i.e.*, exclusive of the work of mine surveying) at the working face and other parts of the underground workings of the mine ;

(b) in direct supervision of such work ;

(c) or in both (a) and (b) ;

(2) that the candidate shall not be entitled to receive or be registered as a holder of a certificate of competency until he has completed the period of practical

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\* Now represented by Clause No. 2 of S.R. and O., 1926, No. 1738.

† As amended by the Order of 24th Dec., 1917 (S.R. & O., 1917, No. 1351, *see* page 104).

102 CERTIFICATES OF COMPETENCY :—QUALIFICATIONS OF APPLICANTS.

experience in mining required by Section 9 (2) (b) of the said Act and No. 3\* of the said Rules.

2. The candidate shall be allowed, if he so desires, to take the subjects of examination as specified in paragraph 4 (a)† or paragraph 4 (b)‡ of the said Rules in groups over a period of three years to date from his first sitting for the examination, as follows :—

Group 1	..	..	Subjects (i) and (vi)
Group 2	..	..	Subjects (ii) and (iii)
Group 3	..	..	Subjects (iv) and (v)

(including in each case the oral examinations in those subjects),

and if he qualifies in all three groups within the period of three years shall be deemed to have passed the examination :

Provided—

- (1) that the candidate shall sit for the first group not later than five years after his release from the colours. If a candidate is recalled to the colours after entering for the examination, the time so spent with the colours shall be excluded for the purpose of computing the period of three years as aforesaid. The period of three years as aforesaid shall be deemed to cover six consecutive examinations held by the Board ;
- (2) The candidate must to qualify in any group obtain 50 per cent. of the maximum marks, including *viva voce*, obtainable for each group and 40 per cent. of the maximum marks, including *viva voce*, obtainable for each subject :—

FIRST-CLASS CANDIDATES.

	Maximum marks obtainable on written paper.	Maximum Number obtainable on oral Examination.	Total.
Subject 1 .. ..	250	100	350
"  2 .. ..	200	80	280
"  3 .. ..	130	52	182
"  4 .. ..	150	60	210
"  5 .. ..	140	56	196
"  6 .. ..	130	52	182
		Total ..	1,400

\* Now represented by Clause No. 2 of S.R. and O., 1926, No. 1738.

† " " " " No. 3 " " 1738.

‡ " " " " No. 4 " " 1738.

CERTIFICATES OF COMPETENCY :—QUALIFICATIONS OF 103  
APPLICANTS.

SECOND-CLASS CANDIDATES.

—	Maximum marks obtainable on written paper.	Maximum Number obtain- able on oral Examination.	Total.
Subject 1 .. ..	300	180	480
" 2 .. ..	300	180	480
" 3 .. ..	100	60	160
" 4 .. ..	100	60	160
" 5 .. ..	100	60	160
" 6 .. ..	100	60	160
		Total ..	1,600

The candidate may within the period of three years as aforesaid be re-admitted to sit for examination in any group or groups in which he fails to qualify.

\*3. If the candidate satisfies the Board that he is disabled from executing mechanical drawing or preparing plans, the Board may dispense with the production of the plan and levelling referred to in paragraph 4 (a) (v)† of the said Rules as amended by the Rules made by the Board on the 9th September, 1913, and may direct that an allowance of marks shall be made to him in respect of any drawing or plan which the candidate would have been required to execute in answering any question in a written examination; provided that the candidate satisfies the Examiners in his oral examination that he possesses the knowledge necessary to comprehend and to make any drawing or plan or levelling which he would otherwise have been required to make.

\* 4. If the candidate satisfies the Board that he is disabled from writing or can only write with difficulty, the Board may substitute an oral examination for the written examination, provided that the standard of examination is not thereby lowered.

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\* By the Order of December 24, 1917, *see* page 104, these Rules have been extended to all candidates who have served in any of His Majesty's Forces for the purposes of the present War, and who may satisfy the Board that in consequence of such service they are disabled from executing mechanical drawing or preparing plans or (as the case may be) that they are disabled from writing or can only write with difficulty.

† Now represented by Clause No. 3 (v) of S.R. and O., 1926, No. 1738.

(c) *Dated December 24, 1917.*

1917. No. 1351.

(1) The Rules made by the Board on the 24th January, 1917,\* are amended and shall take effect as if in Proviso (1) to Rule 1 the words "two and a half years or (in the case of a candidate who has received an approved diploma or taken an approved degree)" were omitted therefrom.

(2) Rules 3 and 4 of the said rules shall extend to all candidates who have served in any of His Majesty's Forces for the purposes of the present War and who satisfy the Board that in consequence of such service they are disabled from executing mechanical drawing or preparing plans or (as the case may be) that they are disabled from writing or can only write with difficulty.

*R. A. S. Redmayne,*  
Chairman.

21st December, 1917.

I hereby approve the foregoing Rules.

*Geo. Cave,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,

24th December, 1917.

4. FEES TO BE PAID BY APPLICANTS FOR CERTIFICATES OF COMPETENCY, AND BY APPLICANTS FOR CERTIFICATES FROM THE BOARD FOR MINING EXAMINATIONS OF QUALIFICATION AS SURVEYOR.

ORDER, DATED SEPTEMBER 18, 1920 (S.R. & O., 1920, No. 1763).

As amended 19th April, 1921 (S.R. & O., 1921, No. 650).

(1) The fees to be paid by applicants for Certificates of Competency as Manager or Under-Manager shall be—  
in the case of a First-Class Certificate, three pounds ;  
in the case of a Second-Class Certificate, one pound ten shillings.

\* S.R. & O., 1917, No. 126, *see* p. 101.



Provided that in the case of applicants who, in pursuance of No. 2 of the Rules made by the Board for Mining Examinations on the 24th January, 1917\* (as to the qualifications of applicants for First and Second Class Certificates of Competency who have served in any of His Majesty's Forces for the purposes of the present War for a period of at least one year, and who before such service had had practical experience in mining), take the subjects of examination in groups, the fees shall be as follows :—For admission to examination or re-examination in any group in the case of a First-Class Certificate one pound, and in the case of a Second-Class Certificate ten shillings.

(2)† The fee to be paid by an applicant for a Certificate from the Board for Mining Examinations of Qualification as a Surveyor shall be two pounds.

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5. ORDER, DATED OCTOBER 12, 1912, PRESCRIBING FEES TO BE PAID FOR COPIES OF LOST CERTIFICATES OF COMPETENCY.

1912. No. 1538.

In pursuance of Section 13 of the Coal Mines Act, 1911, I hereby prescribe that the fees to be paid for copies of Certificates of Competency as Manager or Under Manager shall be :—

in the case of a First-Class Certificate, 5s. ;

in the case of a Second-Class Certificate, 2s. 6d.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,

12th October, 1912.

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\* S.R. & O., 1917, No. 126, *see* page 101.

† As amended by the Order of April 19, 1921 (S.R. & O., No. 650).

**Firemen's, Examiners' and Deputies' Certificates.\***

ORDER, DATED MAY 2, 1912. PRESCRIBED FORM OF CERTIFICATE OF QUALIFICATION OF FIREMAN, EXAMINER, OR DEPUTY.

1912. No. 450.

In pursuance of the provisions of Section 15 (1) (b) of the Coal Mines Act, 1911, I hereby prescribe that the certificates given under those provisions shall be in the form contained in the Schedule hereto.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
2nd May, 1912.

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*Schedule.*

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COAL MINES ACT, 1911.

Certificate of Qualification of Fireman, Examiner, or Deputy under  
Section 15 (1) (b).

This is to certify that \_\_\_\_\_ residing at \_\_\_\_\_  
\_\_\_\_\_ has been duly examined and has satisfied the  
examiners.

- (<sup>1</sup>) (a) That he is able to make accurate tests (so far as practicable with a safety lamp) for inflammable gas;  
(<sup>2</sup>) (b) That he is able to measure the quantity of air in an air current;  
(c) That his hearing is such as to enable him to carry out efficiently the duties of fireman, examiner, or deputy.

(Signature of person authorised in that  
behalf by the approved School, Institution or Authority) \_\_\_\_\_

Date \_\_\_\_\_

Name of Approved School, Institution  
or Authority \_\_\_\_\_

- (<sup>1</sup>) (a) is to be struck out in the case of a candidate producing a certificate from the manager of his mine that he is employed in a mine in which inflammable gas is unknown.  
(<sup>2</sup>) (b) is to be struck out in the case of a candidate producing a certificate from the manager of his mine that he was employed as a fireman, examiner, or deputy on the 16th December, 1911.

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\* A list of the Schools, Institutions and Authorities approved for the purpose of granting these certificates is printed in Appendix X, page 159.

ORDER, DATED AUGUST 13, 1917, PRESCRIBING FORM OF CERTIFICATE AS TO THE EYESIGHT AND HEARING OF A FIREMAN, EXAMINER, OR DEPUTY.

1917. No. 919.

In pursuance of the provisions of Section 15 (1) (c) of the Coal Mines Act, 1911, I hereby prescribe that the certificates given under those provisions shall be in the form contained in the Schedule hereto.

*Geo. Cave,*  
One of His Majesty's Principal Secretaries of State.

Whitehall,  
13th August, 1917.

*Schedule.*

**Mines and Quarries Form No. 73.\***

COAL MINES ACT, 1911.

CERTIFICATE UNDER SECTION 15 (1) (c) AS TO THE EYESIGHT AND HEARING OF A FIREMAN, EXAMINER OR DEPUTY.

(The certificate may be given by an Approved School, Institution or Authority,† or by a duly qualified Medical Practitioner. This form\* must be used in all cases for the certificate.)

<p>This is to certify that (a)..... being the holder of a certificate‡ of qualification as a fireman, examiner or deputy issued to him by the (b) ..... and residing at (c)..... was on the (d).....duly examined and tested in accordance with the requirements of Test (e).....as described on the back of this certificate, and satisfied (f).....</p> <p>§(1) That his eyesight is such as to enable him to make accurate tests for inflammable gas; and</p> <p>(2) That his hearing is such as to enable him to carry out efficiently the duties of a fireman, examiner or deputy.</p> <p>Signature (g) .....</p> <p>(h) .....</p> <p>.....</p> <p>Date.....</p>	<p>(a) Name of applicant.</p> <p>(b) Name of Approved School, Institution or Authority by whom his certificate of qualification under Section 15 (1) (b)¶ was granted.</p> <p>(c) Address of applicant.</p> <p>(d) Date of Test.</p> <p>(e) Insert "A" or "B" as the case may be.</p> <p>(f) Insert "me" or (where the examination is made on behalf of an Approved School, Institution or Authority) "the examiners."</p> <p>(g) Of person authorised for the purpose by the Approved School, &amp;c., or of the duly qualified Medical Practitioner, as the case may be.</p> <p>(h) Insert here name of Approved School, &amp;c., or qualifications and address of Medical Practitioners.</p>
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\* Copies can be purchased through any bookseller, or directly from H.M. Stationery Office at the addresses given on the title page to this volume

† A list of the Schools, Institutions and Authorities approved for the purpose of granting these certificates is printed in Appendix X.

‡ The applicant should be required to produce this certificate.

§ A certificate as to eyesight is not necessary in cases where the applicant produces a certificate from the manager of his mine that he is employed in a mine in which inflammable gas is unknown, and in such cases, but only in such cases, these words may be struck out of the certificate.

¶ See page 106.

*Back of Certificate.*

## TEST A.

*(To be applied by Approved Schools, Institutions and Authorities.)*

(i) EYESIGHT.—The applicant must satisfy the examiner that he can make correct observations of caps produced by various percentages of firedamp on safety lamps of the different types, and burning the different kinds of fuel, in common use in the district in which he is employed.

The use of spectacles or glasses is to be allowed.

(ii) HEARING.—The applicant's hearing is to be tested in such a manner as will satisfy the examiner that it is such as to enable him to detect the movements in the mine of the roof or sides when subject to pressure, the cracking of timber, and the like. It is not to be required that a fireman should possess a standard of hearing above that of the average man, nor is it to be required that his hearing must be up to the standard in both ears. If the applicant is able to hear sounds audible to the average man it will be sufficient.

## TEST B.

*(To be applied by duly qualified Medical Practitioners.)*

(i) EYESIGHT.—(a) The applicant's eyesight must be ascertained—by such tests as the medical practitioner deems effective for the purpose—to be free from any serious optical defect or disease.

(b) It must also be tested by means of the five Official Cards\* (Mines and Quarries Form 74 A-E) in the following manner:—The cards are to be shown to the applicant one at a time and in varying order, being held or placed in a good light directly opposite him on a level with his eyes and at a distance of between two and three feet, and he must be able to state whether any "cap" appears above the flame of the safety lamp shown on the card and to distinguish correctly between the different caps. The applicant should not be allowed to handle the cards.

The use of spectacles or glasses is to be allowed.

(ii) HEARING.—The applicant's hearing is to be tested in such a manner as will satisfy the medical practitioner that it is such as to enable him to detect the movements in the mine of the roof or sides when subject to pressure, the cracking of timber, and the like. It is not to be required that a fireman should possess a standard of hearing above that of the average man, nor is it to be required that his hearing must be up to the standard in both ears. If the candidate is able to hear sounds audible to the average man it will be sufficient.

## Surveyors' Certificates.

THE COAL MINES (PRESCRIPTION OF QUALIFICATIONS OF SURVEYORS) ORDER, 1923, DATED JULY 9, 1923.

1923. No. 816.

In pursuance of the powers conferred upon them by the Coal Mines Act, 1911, under the provisions of the Mining Industry Act, 1920, the Board of Trade hereby prescribe as follows:—

1. Subject to the provisions hereinafter contained, a surveyor, for the purposes of Sections 20 and 21 of the Coal Mines Act,

\* To be purchased through any bookseller, or directly from H.M. Stationery Office at the addresses given on the title page of this volume.

1911 (hereinafter referred to as "the said statutory purposes"), shall not be deemed to possess the prescribed qualifications unless he is the holder of a Surveyor's Certificate from the Board for Mining Examinations (hereinafter called "the Examining Board").

2. A Surveyor's Certificate as aforesaid shall not be granted unless the applicant therefor shall have satisfied the Examining Board, by qualifying as a Candidate in such examination or examinations as they may appoint for a test, that he is competent—

- (a) to make an accurate survey of the workings of a mine and to connect such survey with a surface survey ;
- (b) to make accurate levellings ; and
- (c) to plot accurately surveys and levellings.

3. A Candidate for a Surveyor's Certificate as aforesaid must be at least 21 years of age and must have furnished satisfactory evidence of his sobriety and general good conduct, and must have had practical experience in surveying mines for not less than—

- (a) two years in the case of a candidate who
  - (i) has been granted by an Institution approved by the Board of Trade for the purposes of Section 9 (6) of the Coal Mines Act, 1911, a Degree or Diploma in respect of which the Institution is so approved, or
  - (ii) has passed satisfactorily a full course of instruction in surveying at an Institution\* approved by the Board of Trade for the purposes of this Order in respect of such course, or
  - (iii) has served in His Majesty's Forces for at least twelve calendar months (which need not be consecutive) between the 1st August, 1914, and the 31st December, 1919 ;

(b) four years in all other cases.

Provided that Paragraph (a) (iii) of this Clause shall cease to have effect as from the 1st March, 1926.

4. Notwithstanding anything contained in the two last preceding Clauses, the Examining Board may, in their discretion, exempt from the whole or any part of any examination or examinations appointed by them in pursuance of this Order,

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\* For list of Approved Courses, see Appendix IX, page 155.

any applicant holding a Mine Surveyor's Certificate granted by the Government of any British Dominion or Possession or of any foreign country, and thereupon such applicant shall be deemed for the purpose of this Order to have qualified to the satisfaction of the Examining Board as a Candidate in any examination or part of an examination from which he is so exempted.

5. The Order of the Board of Trade dated the 16th April, 1921,\* prescribing the qualifications of Surveyors, is hereby revoked; but nothing in this Order shall affect any Certificate of Qualifications which is in force under the provisions of the said Order of the 16th April, 1921, immediately before the date when this Order shall take effect, or prevent the continued validity of any such Certificate for the said statutory purposes.

6. This Order may be cited as the Coal Mines (Prescription of Qualifications of Surveyors) Order, 1923, and shall take effect as from the 1st September, 1923.

Dated this ninth day of July, 1923.

*G. R. Lane-Fox,*  
Secretary for Mines.

Board of Trade,  
Mines Department,  
Dean Stanley Street,  
Westminster, S.W. 1.

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### Safety Lamp Mines (Sec. 35).

1. ORDER, DATED OCTOBER 24, 1912, AUTHORISING THE USE UNDERGROUND OF APPARATUS FOR THE RELIGHTING ELECTRICALLY OF SAFETY LAMPS.

1912. No. 1628.

In pursuance of the power conferred on me by Section 35 (1) of the Coal Mines Act, 1911, I hereby authorise the use underground of apparatus for the relighting electrically of safety lamps; provided—

- (1) the apparatus complies in all respects with the requirements of any rules or regulations in force for the time being with respect to the use of electricity under-

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\* S.R. & O., 1921, No. 641.

- ground, and is used in accordance with the provisions of such rules or regulations and of the said Act\* ;
- (2) the station where the apparatus is used shall not be within a distance of 200 yards of any part of the working face ;
  - (3) when not in use the apparatus shall be kept securely locked and no person shall be given or have in his possession any key or contrivance for unlocking the apparatus, other than a person appointed in pursuance of Section 34 (1) (iii) of the said Act.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
24th October, 1912.

2. MANNER OF SEARCH OF PERSONS EMPLOYED BELOW GROUND  
FOR PROHIBITED ARTICLES BEFORE THE COMMENCEMENT  
OF WORK.

ORDER DATED MAY 21, 1912.

1912. No. 510.

In pursuance of Section 35 (2) of the Coal Mines Act, 1911, I hereby prescribe that the manner of searching persons employed below ground for the purpose of ascertaining before they

\* The chief provisions at present in force are as follows :—

- (1) A safety lamp (other than an electric hand lamp) must not be relighted except
 

<ol style="list-style-type: none"> <li>(a) At an appointed station which must not be in a return airway,</li> <li>(b) by a competent person appointed in writing by the manager for the purpose,</li> <li>(c) after examination by the person appointed.</li> </ol>	}	Section 34 (1) (iii).
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The lamp must also be examined by the appointed person after being relighted and before being issued [General Regulations, No. 135 (c), page 27].
- (2) The apparatus must not be used in any part of a mine where inflammable gas, although not normally present, is likely to occur in quantity sufficient to be indicative of danger [General Regulations, Nos. 135 (b) and 132, pages 27 and 26].
- (3) The apparatus (a) must be so constructed, installed, protected, worked and maintained as to prevent danger so far as is reasonably practicable and in particular (b) must be so constructed, worked and maintained as to preclude the accumulation of explosive gas within it [General Regulations, Nos. 124 (a) and 135 (a), pages 21 and 27].

commence work whether they have in their possession any article prohibited under that section shall be as follows :—

- (1) The search shall be made by a person, or persons, appointed for the purpose in writing by the manager.
- (2) In the case of members of a shift the search shall be made in the presence of two or more members of the shift.
- (3) The search shall be made with due regard to propriety and so as to occasion the person searched as little inconvenience as possible.
- (4) The person conducting the search shall—
  - (a) search or turn out all pockets ;
  - (b) pass his hands over all clothing ;
  - (c) examine any article in the workman's possession.
- (5) If the person conducting the search suspects that the person searched is concealing any prohibited article, he shall detain him and as soon as possible refer the matter to the manager, under-manager, or other official authorised by the manager for the purpose, who shall not allow the person to proceed to work until he has satisfied him that he has no prohibited article in his possession.

*R. McKenna,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
21st May, 1912.

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### Miscellaneous.

#### 1. HOURS OF EMPLOYMENT OF WINDING ENGINEMEN—PRE- SCRIBING DATE UNDER SECTION 57 (3).

ORDER DATED APRIL 1, 1913.

1913. No. 341.

In pursuance of Section 57 (3) of the Coal Mines Act, 1911, I hereby prescribe that the date after which under the said Section a winding engineman may not be employed for more than eight hours in any one day, except as provided by the General Regulations made under the Act,\* shall be 30th June, 1913.

*R. McKenna,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
1st April, 1913.

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\* See page 47.



2. PROCEDURE AND COSTS OF REFERENCES IN REGARD TO COST OF MAINTENANCE OF WASHING AND DRYING ACCOMMODATION.

REGULATIONS DATED SEPTEMBER 4, 1913.

1913. No. 955.

In pursuance of the powers conferred on me by subsection (3) of Section 77 of the Coal Mines Act, 1911, I hereby make the following regulations as to procedure and costs of references under the said subsection :—

(1.) If, on receipt of a representation in pursuance of subsection (1) of the said section, the owner of the mine estimates that the total cost of maintenance of the accommodation and facilities required by the section and general regulations made thereunder will exceed threepence per week for each workman liable to contribute, he shall within 40 days from the receipt of the representation post a notice to that effect at the pithead together with a copy of the estimates prepared or obtained by him, or a statement of the particulars on which his estimate is based ; and unless the representation is withdrawn by a majority, ascertained by ballot,\* of the workmen employed in the mine to whom the section applies,† the question of the estimated total cost of maintenance shall be referred to an arbitrator in pursuance of subsection (3).

(2.) If the representation is not withdrawn within 20 days, and if no arbitrator is appointed by agreement between the parties within 30 days, of the date on which the aforesaid notice is posted at the pithead, the owner shall make application in writing to the Judge of County Courts for the district, or in Scotland to the Sheriff of the County, to appoint an arbitrator, and shall forward to him copy of the notice aforesaid.

(3.) The arbitrator when appointed shall at once serve notice on the owner of the time and place fixed by him for the hearing of the reference, and the owner shall at once cause a copy of the notice to be posted at the pithead.

(4.) The time fixed by the arbitrator for the hearing shall be not less than seven days and not more than twenty-one from the

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\* The manner in which the ballot is required to be taken is prescribed by the Order of June 22, 1912, under Section 118 of the Act, printed on page 119.

† "The workmen to whom this section applies are all workmen employed underground, and all workmen engaged on the surface in handling tubs, screening, sorting or washing coal, or loading coal into wagons." Coal Mines Act, 1911, Section 77, subsection 6.

time of his appointment, and the place shall be at the mine, unless the parties otherwise agree.

(5.) The owner may appear personally or by any agent. The workmen employed in the mine to whom the section applies\* may appoint any person to represent them at the hearing.

(6.) At least three days before the hearing of the reference the owner shall furnish the arbitrator and the person appointed by the workmen to represent them at the hearing with copies of the estimates prepared or obtained by him, and if any estimates have been prepared or obtained by the workmen, copies shall at least three days before the hearing be furnished to the arbitrator and owner.

(7.) The arbitrator may examine any persons tendered by the parties as witnesses, and may make such inspection of the mine as he may deem necessary.

Subject to the provisions of these regulations the proceedings at the hearing shall be such as the arbitrator may in his discretion direct.

(8.) The arbitrator shall communicate his decision in writing to both parties as soon as possible after the hearing.

(9.) The remuneration of the arbitrator, if he was appointed by agreement between the parties, shall be such sum as may have been agreed between the arbitrator and the parties, or, if he was appointed by the Judge or Sheriff, shall be a sum of five guineas together with any expenses necessarily incurred for travelling, or in a case of exceptional difficulty such special fee not exceeding ten guineas as may be fixed by the Judge or Sheriff. The remuneration of the arbitrator shall be payable by the owner unless the arbitrator is of opinion that the men have acted unreasonably in carrying the matter to arbitration and directs that the whole or any part thereof shall be paid by the men.

*R. McKenna,*

One of His Majesty's Principal  
Secretaries of State.

Home Office,  
Whitehall,  
4th September, 1913.

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\* See footnote † to previous page.

3. MANNER OF SETTLING DISPUTES UNDER THE ACT.

\*ORDER, DATED OCTOBER 17, 1912, PRESCRIBING THE TIME AND MANNER OF SERVING NOTICES UNDER SECTION 116.

1912. No. 1539.

In pursuance of Section 116 of the Coal Mines Act, 1911, I hereby prescribe that the time within which and the manner in which the notice required by that Section is to be served shall be as follows :—

- (1) The notice shall be served within 14 days after receipt of the order, requisition, refusal of sanction or notice to which the party serving the notice objects or with which he refuses to comply.
- (2) The notice shall be in writing and shall state the grounds of objection or of the refusal to comply.
- (3) The notice shall be sent by registered post and shall be addressed in the case of an order or notice of the Secretary of State to the Secretary of State, and in the case of a requisition or refusal of sanction or notice from an Inspector to the Inspector of the Division.

This Order does not apply to objections sent in pursuance of Section 99 or of the Second Schedule to the Act.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
17th October, 1912.

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\* The matters under the Act to which this Order applies are those mentioned in—

Sec. 4 (3) : Order of Secretary of State limiting the number of mines under one manager.

Sec. 25 (3) : Division of mine into parts.

Sec. 32 (3) : Reintroduction of naked lights.

Sec. 43 (1) : Question whether character of strata makes it unreasonable to require clear space to be provided at side of haulage road.

Sec. 45 (1) : Height of travelling roads.

Sec. 50 (5) : Adequacy of system of supporting roof and sides adopted by management.

Sec. 60 (1) : Use of electricity.

and, in addition, the following matters which under General Regulations are required to be settled in manner provided by the Act for settling disputes—

*General Regulations dated July 10, 1913 :—*

Regulation 89 : Exemption from provision requiring two main intake airways (page 12).

Regulations 137 (b) : Application of electricity regulations to apparatus in use before 1st June, 1911 (page 27).

*General Regulations dated July 30, 1920 :—*

Regulation 4 : Test to be applied to determine the composition of dust mixture (page 55).

Regulation 5 : Injurious nature of dust (page 55).

Regulation 9 : Requirement by Secretary of State of precautions against spontaneous combustion (page 56).

Regulation 29 : Precautions required by Secretary of State to be taken when working under moss, &c. (page 64).

4. PROCEDURE BEFORE REFEREES AND COST OF PROCEEDINGS.  
RULES MADE BY THE REFERENCE COMMITTEE, DATED JANUARY 8,  
1913.

1913. No. 10.

In pursuance of Section 117 of the Coal Mines Act, 1911, the Reference Committee constituted under that Section hereby make the following rules :—

1. These rules may be cited as the Coal Mines (Reference) Rules, 1913.

2.—(1) In these rules, unless the context otherwise requires,—

“ The Act ” means the Coal Mines Act, 1911.

“ The Secretary of State ” means the Secretary of State for the Home Department.

“ Matter for reference ” means—

(a) any objection to General Regulations proposed to be made under the Act which is required to be referred to a referee by Part I. (4) of the Second Schedule to the Act, or is referred by the Secretary of State to a referee under Part I. (6) or (7) of that Schedule ; or

(b) any objection to Special Regulations proposed to be made under the Act which is required to be referred under Part II. (4) of the Second Schedule to the Act ; or

\*(c) any matter required by the Act to be settled in manner provided by the Act for settling disputes.

“ Parties to the reference ” means—

(a) in the case of a reference relating to any objection to General Regulations proposed to be made under the Act, the Secretary of State and any body of persons who have made a general objection as defined by Part I. (8) of the Second Schedule to the Act, or any person or body of persons who have submitted an objection referred by the Secretary of State to a referee under Part I. (6) or Part I. (7) of the said Schedule ;

(b) in the case of a reference relating to an objection to Special Regulations, the Secretary of State, the person or body of persons proposing the Special Regulations, and the person or body of persons making objection thereto ; or

(c) in the case of any other reference, the Secretary of State or one of His Majesty's Inspectors of Mines and the person making objection or refusing compliance with the provisions of the Act in regard to which the matter for reference has arisen.

(2) The Interpretation Act, 1889, applies for the purpose of the interpretation of these rules as it applies for the purpose of the interpretation of an Act of Parliament.

3. In the case of any matter for reference arising, the Secretary of State shall send to the Reference Committee a statement setting forth the matter for reference, and, in the case of an objection to General or Special Regulations proposed to be made under the Act, a copy of such proposed General or Special Regulations, together with a copy of the objection or objections, and shall inform the Committee that a reference is necessary.

4. The referee shall be selected by the Reference Committee from the panel of persons appointed by them to act as referees for the purposes of the Act, and, in making the selection, the Committee shall have regard to the nature of the matter for reference and shall consider any joint representations made by some or all of the parties in regard to the person to be appointed.

5.—(1) As soon as the Reference Committee have selected the referee, they shall inform the parties to the reference of the name and address of the referee selected.

(2) The Reference Committee shall furnish the referee with copies of the documents submitted to them by the Secretary of State in connection with his application for the reference.

6. In the case of a reference relating to any objection to General Regulations proposed to be made under the Act, the referee, if he considers that he requires the assistance of a person or persons possessing legal or special knowledge to act as assessor or assessors to him at the hearing, may apply to the Reference Committee to appoint such person or persons for the purpose.

7.—(1) The referee selected shall, as soon as may be, proceed to fix the time for the hearing of the reference, which shall not be less than three days or more than twenty-one days from the time of his appointment, unless the Reference Committee for special cause shown approve an extension of this period, and he shall forthwith serve notice by post on the parties to the reference of the time and place fixed by him for the hearing of the reference.

(2) Unless otherwise directed by the Reference Committee, or by the referee, the hearing by the referee of the reference shall be in private. It shall be open to the parties to the reference to appear at the hearing either in person or by solicitor or counsel or agent.

(3) (a) In the case of a reference relating to proposed General Regulations, if a substantial number of the owners or of the workmen affected thereby who have not made a general objection to the proposed Regulations apply to the referee for permission to be represented at the hearing of the reference, the referee shall require the applicants to submit a statement in writing of the grounds on which they desire to be heard, and, unless he is of opinion that the application is frivolous or is not made by a substantial number of the owners or of the workmen affected by the proposed Regulations, he shall allow the applicants to attend and take part in the proceedings.

(b) In the case of a reference relating to Special Regulations, the owner or a majority of the workmen, if he or they have not made objection to the proposed Regulations, may apply to the referee for permission to take part in the proceedings at the hearing of the reference, and on receipt of such application the referee shall allow the applicant or applicants to attend and take part in the proceedings.

(c) Where the referee has granted an application made by a number of owners or of workmen under paragraph 3 (a) or 3 (b) of this rule for permission to take part in the proceedings at the hearing of a reference, he may require the applicants to appear at the hearing by solicitor or by counsel or by agent.

(4) The referee may make such inspection of any mine or mines affected by the reference as he may deem necessary.

(5) The referee may adjourn the hearing from time to time so far as may be consistent with the prompt settlement of any question affecting the safety of workmen in the mine or mines, and may hold adjourned sittings at any place which he thinks necessary for the convenience of the parties to the reference.

(6) Subject to the provisions of these rules, the proceedings at the hearing of a reference shall be such as the referee may in his discretion direct.

8. The referee shall cause copies of his decision to be furnished to the parties to the reference as soon as possible after the hearing.

9. The Reference Committee may, in the case of the death or incapacity of the referee originally selected, or in any other case, if it is shown to the Committee that it is expedient to do so at any time before the referee has given his decision, revoke the reference to the selected referee, and select another referee for the purpose of determining the reference.

10. Any failure on the part of any authority or any person to comply with the provisions of these rules, shall not render the proceedings on a reference to a referee, or anything done in pursuance thereof, invalid, unless the referee so direct.

11.—(1) The remuneration of the referee shall (a) if the matter for reference relates to a general objection to General Regulations, be a sum of 15 guineas for each day on which he is engaged in hearing the reference, together with any expenses for travelling and subsistence necessarily incurred; (b) in all other cases, be a sum of 10 guineas for each day on which he is engaged in hearing the reference, together with any expenses for travelling and subsistence necessarily incurred; provided that in any case of exceptional difficulty a special fee may be paid on the recommendation of the Reference Committee with the approval of the Treasury.

(2) The remuneration of an assessor shall be a sum of 10 guineas for each day on which he sits as assessor to the referee, together with any expenses for travelling and subsistence necessarily incurred.

12. The cost of the proceedings, including the remuneration of the referee and of the assessor, if appointed, shall be payable in such manner as the referee may direct.

*Aberstone, C.J.*  
*Dunedin, Lord President.*  
*T. E. Forster.*

5. PROCEDURE FOR ASCERTAINING AND CERTIFYING VIEWS OF WORKMEN.

ORDER DATED JUNE 22, 1912.

1912. No. 634.

In pursuance of Section 118 of the Coal Mines Act, 1911, I hereby make the following rules:—

(1.) In any case where the views of the workmen or any part of the workmen in any mine are required to be ascertained for any of the purposes of the Act, they shall, unless a ballot is expressly required by the Act,\* be ascertained by a show of hands at a meeting of the workmen entitled to vote of which not less than three days' notice shall be given by a notice posted at the pithead specifying the time and place of meeting. A certificate stating the result of the voting and signed by the person presiding at the meeting shall be forthwith delivered to the owner, agent or manager of the mine.

(2.) If within seven days after a meeting as aforesaid the owner, agent or manager of the mine, or not less than one-tenth of the workmen entitled to vote by signed notice served on the owner, agent or manager, demand a ballot, or if the Secretary of State in any matter in which he is concerned by notice served on the owner, agent or manager, directs that a ballot shall be taken, or in any case where the Act requires a ballot to be taken, a ballot shall be taken in the manner hereafter provided.

(3.) Within 21 days after the date of the meeting or after the receipt of a notice as aforesaid as the case may be, or (in a case where the Act requires the views of the workmen to be ascertained by ballot) after receipt of a notice signed by not less than one-tenth of the persons employed at the mine that it is desired that a ballot shall be taken, the manager shall cause a register to be prepared of the workmen entitled to vote

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\* The matter in regard to which a ballot is expressly required are—

- (1) The question of the provision of baths, &c. [Section 77 (1)].
- (2) The question of withdrawal of representation as to provision of baths, &c. [No. 1 of Regulations of September 4, 1913 (page 113)].
- (3) The question of discontinuance of baths, &c. [Section 77 (9)].
- (4) The election of workmen's representatives on the Committee of Management of Baths, &c. [No. 9 of General Regulations of August 29, 1913 (page 45)].
- (5) The proposal of special regulations by workmen [Section 87].

(4.) The register shall be open to inspection by the workmen at the mine, and by the check-weigher or other representative of the workmen as hereinafter mentioned, for at least one week before the ballot is taken.

(5.) The taking of the ballot shall be carried out by a representative of the owner, agent or manager, and the check-weigher or other representative of the workmen, and shall take place on the second Saturday after the completion of the register, or any earlier day agreed upon by the said representatives.

(6.) The hours during which the ballot shall be taken shall be such hours as may be agreed upon by the said representatives, or, in default of agreement, between 8 a.m. and 8 p.m.

(7.) Notice of the purpose for which and the place at which the ballot is to be taken and the day and hours fixed for the ballot shall be posted by the said representatives at the pithead not less than three days before the day fixed for the ballot.

(8.) The ballot paper shall be in the form set out in the Schedule hereto, and shall not be marked in any way whatsoever so as to identify the person voting.

(9.) A ballot paper shall be delivered by the said representatives to any person applying to them and entitled to vote, who shall forthwith mark his vote thereon, fold the paper so as to cover the mark, and deposit it in a box to be provided for the purpose.

(10.) Arrangements shall be made to enable a workman to mark his vote screened from observation.

(11.) The ballot papers shall be examined and the votes counted by the said representatives, and a certificate in the form set out in the Schedule hereto of the result of the ballot and of the total number entitled to vote shall be signed by them in duplicate: one copy to be retained by the representative of the workmen, the other copy to be delivered to the owner, agent or manager, who in the case of any matter under Sections 86 and 87 and the Second Schedule to the Act, shall forward it forthwith to the Secretary of State.

(12.) If any dispute arises as to how any particular ballot paper shall be counted, the matter shall be referred to the Inspector of Mines for the Division, who shall decide the matter so as to give effect, as far as possible, to the intention of the person voting and whose decision shall be final.

*R. McKenna,*  
One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
22nd June, 1912.

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*Schedule.*

**A.—FORM OF BALLOT PAPER FOR USE EXCEPT IN THE CASE OF ELECTION OF WORKMEN'S REPRESENTATIVES.**

Are you in favour of\*

*Write "Yes" or "No" in the space below.*

**B.—FORM OF BALLOT PAPER FOR USE IN ELECTION OF WORKMEN'S REPRESENTATIVES.**

Election of Workmen's Representatives.

Names of Candidates.	Place a Cross below against the Name of each Candidate for whom you wish to Vote. You must not Vote for more than

**C.—FORM OF CERTIFICATE OF RESULT OF BALLOT.**

We, the undersigned, representing respectively the owner, agent or manager of the \_\_\_\_\_ Mine, and the workmen employed at the said mine, hereby certify that on the \_\_\_\_\_ a ballot was duly taken, in accordance with the rules made by the Secretary of State, on the question†

- \* Specify question on which the poll is to be taken, *e.g.* :—  
 [Accommodation for taking baths and drying clothes being provided at the mine.]  
 [Accommodation for taking baths and drying clothes being provided no longer at the mine.]  
 [The wages of persons employed in or about the mine being paid weekly.]
- † Specify question on which the poll was taken, *e.g.* :—  
 [Whether accommodation for taking baths and drying clothes should be provided at the mine.]  
 [Whether accommodation for taking baths and drying clothes should no longer be provided at the mine.]  
 [Of the election of the representatives of the workmen on the Baths Committee.]  
 [Whether the wages of all persons employed in or about the mine should be paid weekly.]



COAL MINES REGULATION ACT, 1908 :—PROCEDURE AND 123  
COSTS OF REFERENCES.

(vi) The test shall not be applied to any animal which, after making reasonable inquiry, the veterinary surgeon knows to have received a mallein injection within the preceding month.

(vii) The mallein used for the test shall be obtained from the Royal Veterinary College and shall be used in the dose specified by the College.

2 The Order of the Board of Trade dated dated January 1, 1921,\* prescribing the manner of testing horses for glanders before being taken underground, is hereby revoked.

3. This Order may be cited as the Horses in Coal Mines (Glanders) Order of the 12th March, 1923.

*G R. Lane-Fox,*  
Secretary for Mines.

Mines Department,  
Dean Stanley Street,  
Millbank, S.W. 1.  
12th March, 1923.

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COAL MINES REGULATION ACT, 1908.

REGULATIONS, DATED MAY 15, 1909, AS TO PROCEDURE AND  
COSTS OF REFERENCES UNDER SECTION 1 (5).

1909. No. 516.

In pursuance of the powers conferred on me by subsection (5) of Section 1 of the Coal Mines Regulation Act, 1908, I hereby make the following regulations as to procedure and costs of references under the said subsection.

1. The Inspector shall send to the owner, agent or manager a statement in the prescribed form of the times approved by him under Section 1 (4), and in the event of the owner, agent or manager feeling aggrieved by the decision of the Inspector and desiring the matter to be referred to the decision of a person appointed by the Judge of County Courts or in Scotland by the Sheriff of the County in pursuance of Section 1 (5), he shall give notice in writing of his objection to the Inspector within one week of the receipt of the Inspector's statement, setting out in the notice the specific grounds of objection and the modifications asked for.

2. On receipt of a notice of objection, the Inspector shall make application in writing to the Judge of County Courts for the district or in Scotland to the Sheriff of the County to appoint a referee, and shall forward to him copies of his statement and of the notice of objection.

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\* S. R. & O., 1921, No. 42.

3. The referee when appointed by the Judge or Sheriff shall at once serve notice by post on the Inspector and on the owner, agent or manager of his appointment and of the time and place fixed by him for the hearing of the objection.

4. The time fixed by the referee for the hearing shall be not less than three days and not more than fourteen from the time of his appointment, and the place shall be at the mine, unless the Inspector and the owner, agent or manager otherwise agree.

5. The Inspector may appear at the hearing personally or by an Assistant Inspector. The owner, agent or manager may appear personally or by an official of the mine. Neither party shall appear by solicitor or counsel.

A majority of the workmen employed underground at the mine may appoint any person, not being a solicitor or counsel, to represent them at the hearing, and any person so appointed may take part in the proceedings at the hearing in such manner as the referee may direct.

6. The referee may examine the parties and any persons employed at the mine or tendered by the parties as witnesses, and may make such inspection of the mine as he may deem necessary.

7. The referee shall communicate his decision in writing to both parties as soon as possible after the hearing.

8. The remuneration of the referee shall if the hearing takes place at the mine be a sum of five guineas together with any expenses necessarily incurred for travelling; if the hearing takes place elsewhere, a sum of three guineas; provided that in any case of exceptional difficulty a special fee may be paid on the recommendation of the Secretary of State approved by the Treasury. The remuneration of the referee shall be payable in equal portions by the parties unless the referee otherwise direct on the ground that the objection was unreasonable, or on other special grounds to be stated by him in writing.

*H. J. Gladstone,*  
One of His Majesty's Principal  
Secretaries of State.

Home Office,  
Whitehall,  
15th May, 1909.

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## NOTICE OF ACCIDENTS ACT, 1906.

ORDER, DATED DECEMBER 22, 1906, REQUIRING THE REPORTING OF CERTAIN CLASSES OF DANGEROUS OCCURRENCES IN MINES AND QUARRIES WHETHER PERSONAL INJURY IS CAUSED OR NOT.

1906. No. 934.

In pursuance of Section 5\* of the Notice of Accidents Act, 1906, I hereby extend the provisions of the said Act requiring notice of accidents in mines and quarries to be given to an Inspector to the following classes of occurrences, whether personal injury or disablement is caused or not :—

All cases of ignition of gas or dust below ground other than ignitions of gas in a safety lamp.

All cases of fire below ground.

All cases of breakage of ropes, chains, or other gear by which men are lowered or raised.

All cases of overwinding cages while men are being lowered or raised.

All cases of inrush of water from old workings.

*H. J. Gladstone,*

One of His Majesty's Principal  
Secretaries of State

Whitehall,  
22nd December, 1906.

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## APPENDIX I.

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MINES AND QUARRIES (INSPECTION DIVISIONS) ORDER, 1924.

1924. No. 951.

In pursuance of the powers conferred upon them, under the provisions of the Mining Industry Act, 1920, by the Coal Mines Act, 1911, the Metalliferous Mines Regulation Acts, 1872 and 1875, and the Quarries Act, 1894, the Board of Trade hereby order as follows :—

(1.) For the purposes of inspection under the Coal Mines Act, 1911, the Metalliferous Mines Regulations Acts, 1872 and 1875, and the Quarries Act, 1894, Great Britain shall be divided into eight Divisions, entitled and constituted respectively as herein provided, that is to say,

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\* This section, so far as it relates to mines under the Coal Mines Act, 1911, is repealed by that Act and re-enacted in Section 81.

No. 1 or Scotland Division, consisting of the whole of Scotland.

No. 2 or Northern Division, consisting of the Counties of Northumberland, Durham, Cumberland, Westmorland, the North Riding of the County of York, the detached part of the County of Lancaster north of Morecambe Bay, and the Isle of Man.

No. 3 or Yorkshire Division, consisting of the East and West Ridings of the County of York (except that portion of the West Riding which was transferred for administrative purposes from the County of Lancaster by the Local Government Act, 1888).

No. 4 or North Midland Division, consisting of the Counties of Derby, Leicester, Lincoln and Nottingham.

No. 5 or Lancashire and North Wales Division, consisting of the County of Lancaster (except the detached part north of Morecambe Bay); the area which was transferred for administrative purposes from the County of Lancaster to the West Riding of the County of York by the Local Government Act, 1888; the County of Chester (except that portion which includes the parishes of Church Lawton, Odd Rode and Wildboardclough, and the portion situated on the east side of the North Staffordshire Railway from Mow Cop Station to North Rode Station, and south of the North Staffordshire Railway from North Rode Station to Rushton Station); the Counties of Flint, Denbigh, Montgomery, Merioneth, Carnarvon and Anglesey.

No. 6 or Cardiff and Newport Division, consisting of the County of Monmouth; so much of the County of Glamorgan as includes the parishes of Aberdare, Rhondda, Llantrisant, Coychurch Higher, Pencoed, Coychurch Lower, Llan-Gan, Colwinston, Llandow and St. Donats, and all parishes to the East thereof; so much of the County of Brecon as includes the parishes of Llyswen, Llandefalle, Llanfilo, Llan-y-wern, Llanhamlach, Llanfrynach, Cantref, Penderyn and all parishes to the East thereof; the Counties of Radnor and Cardigan.

No. 7 or Swansea Division, consisting of the Counties of Carmarthen, Pembroke, West Glamorgan (namely, that part of the County of Glamorgan not included in the Cardiff and Newport Division), and West Brecon (namely, that part of the County of Brecon not included in the Cardiff and Newport Division).

No. 8 or Midland and Southern Division, consisting of so much of the County of Chester as is not included in the Lancashire and North Wales Division, and the Counties of Stafford, Salop, Worcester, Warwick, Hereford, Gloucester, Northampton, Rutland, Huntingdon, Cambridge, Oxford, Berks, Buckingham, Bedford, Hertford, Middlesex, Norfolk, Suffolk, Essex, Somerset, Devon, Cornwall, Dorset, Wilts, Southampton, London, Surrey, Sussex, and Kent.

(2.) The Mines Inspection Divisions Order of the 23rd April, 1913, is hereby revoked.

(3.) This Order may be cited as the Mines and Quarries (Inspection Divisions) Order, 1924, and shall come into force on the First day of September, 1924.

*E. Shinwell,*  
Secretary for Mines.

Mines Department,  
Dean Stanley Street,  
Millbank, S.W.1.

12th August, 1924.

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## APPENDIX II.

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### MEMORANDUM ON THE TEST OF EXPLOSIVES FOR INCLUSION IN THE PERMITTED LIST.

**1. Explosive.**—No explosive can be received at the Testing Station for the purpose of being officially tested or of being fired experimentally unless (1) it has been placed on the Authorised List of explosives in force for the time being or has passed the chemical test for being placed on that list,\* and (2) the Secretary of State is satisfied that both the explosive and the cartridge or combination in which it is proposed to issue it are of such a character as not to be liable to deteriorate or to be misused or to become dangerous under the conditions of storage or practical use.

**2. Application for test.**—When it is desired to submit an explosive to the official test, an application form should be obtained from H.M. Inspectors of Explosives, and this when filled in should be forwarded together with the prescribed fee (*see Appendix B*) to the Under-Secretary of State, Home Office, Whitehall, S.W.1. The exact percentage of each ingredient should be stated.

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\* So far as regards experimental shots, it will be sufficient if the explosive has passed the preliminary tests only for inclusion in the authorised list of explosives.

3. **Second Trial.**—If an explosive fails to pass, no second trial will be allowed without the special sanction of the Secretary of State.

4. **Permitted List.**—Explosives which pass the test, the conditions of which are set out in Appendix A, will be placed on the Permitted List.\* This list will specify the composition of the explosive, allowing a small margin in the percentages of the ingredients to cover the variations which arise during manufacture; and will lay down the maximum charge which may be used, and other conditions as to the use of the explosive. The list will also specify in the case of each explosive by what manufacturer and at what factory or factories it is to be made; but alterations in the name of the manufacturer and in the factory or factories will be allowed on good cause being shown.

5. **Altered explosive.**—In the event of the manufacturer desiring to make an alteration in an explosive already on the list, a test for an altered explosive will be allowed if the alteration, in the opinion of the Secretary of State, is not such as to constitute a new explosive. An explosive cannot be regarded as an "altered explosive" if the alteration is such as to make fresh chemical examination for the purposes of the Authorised List necessary. No alteration in the maximum charge will be allowed. Application for the testing of an altered explosive should be made on the same form as for a new explosive, and should be forwarded to the Under-Secretary of State, Home Office, Whitehall, S.W. 1, together with the prescribed fee (*see* Appendix B).

6. **Official re-test.**—The Secretary of State may at any time cause any explosive on the Permitted List to be formally re-tested. Notice of any formal re-test will be sent to the manufacturer of the explosive.

7. **Removal from Permitted List.**—If any explosive fails on formal re-test, the Secretary of State will, if he thinks fit, remove it from the Permitted List, or he may allow its retention on the Permitted List with a lower maximum charge, to be determined by a fresh test of the explosive. He also reserves the right, after such inquiry as he may think fit, to remove from the Permitted List any explosive which in practical use is found to cause ignitions or to be otherwise dangerous, or which on examination proves to be of defective composition or bad manufacture, or fails in any way to comply with the conditions on which its use is permitted.

8. **Experimental shots.**—Applications for firing experimental shots to enable manufacturers to form an idea as to the probability of a new explosive passing the official test or to assist them in working out an improved explosive should be addressed to His Majesty's Chief Inspector of Explosives, Home Office, Whitehall, S.W. 1.

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\* For list of Permitted Explosives, *see* pages 77 and 78.



As a general rule, it will not be possible to fire experimental shots on the same day as the Official Test.

The fee for such shots will be in accordance with the rate specified in Appendix B.

The exact composition of the explosive, together with the nature and material of the cartridge or wrapper in which it is proposed to issue it, should be stated.

**9. Consignment of Explosives.**—The amount of explosive required for the Official Test will be 50 lbs. made up as follows :—

48 lbs. in cartridges  $1\frac{3}{8}$  inches  $\pm \frac{1}{16}$  in diameter, of which—  
33 lbs. should be in cartridges each containing 8 ozs. of explosive.

10 lbs. should be in cartridges each containing 4 ozs. of explosive.

5 lbs. should be in cartridges each containing 2 ozs. of explosive.

The remaining 2 lbs. to be in cartridges of  $1\frac{1}{2}$  inches diameter and containing 4 ozs. of explosive each.

Explosives should be forwarded, carriage paid, to—

H.M. Inspector of Explosives,  
Home Office Testing Station,  
Car House Colliery,  
Rotherham,  
Yorks.

The Secretary of State reserves to himself the right of storing all explosives submitted for the Official Test for at least 30 days prior to the Test.

Explosives must not be despatched to the Testing Station until sanction has been obtained from H.M. Inspectors of Explosives.

**10. Manufacturers at Testing Station.**—Manufacturers and their representatives can attend at the Testing Station when their explosives are being officially tested or re-tested, or when experimental shots with their explosives are being fired.

Home Office,  
May, 1912.

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*Appendix A.*

1. The test will be carried out by H.M. Inspectors of Explosives with the testing apparatus at the Home Office Testing Station at Rotherham.

2. The test will be carried out as follows :—

Shots will be fired into a mixture of gas and air until the largest charge which can be fired without igniting the mixture is found. Further shots will then be fired—beginning with this charge and, in the event of an ignition, reducing the charge—until five shots of the same weight have been fired without igniting the mixture.

Shots will then be fired with the charge so determined into coal dust, and the same procedure adopted, until five shots of the same weight have been fired without igniting the coal dust.

The lower of the charges thus determined will be known as the "Maximum Charge."

In making alterations to the weight of the charges, the increment or decrement of charge will not be less than two ounces.

3. In loading the gun the charge will be pushed to the bottom of the bore (a clay plug having been previously inserted to protect the crown of the bore), and will have no tamping.

4. The coal dust will be ground to such a degree of fineness that not less than 90 per cent. will pass through a sieve of 150 meshes to the linear inch.

5. In addition to the foregoing shots, other shots will be fired at the ballistic pendulum, and the swings registered on the sliding scale provided for the purpose will be recorded. The mean swing thus obtained will be published in comparison with that given by a charge of gelignite containing 60 per cent. of nitro-glycerine.

6. Every shot will be fired electrically, and in the case of high explosives a detonator of the size recommended by the manufacturer or the person submitting the explosive will, subject to the approval of the Home Office, be used.

7. Each shot will be fired in the case, wrapper or covering in which the explosive is proposed to be employed in actual use.

8. An explosive will be considered to have passed the test :—

(1) If the " Maximum Charge " as above determined is not less than eight ounces.

(2) If in the shots at the pendulum no appreciable amount of the charge has been left unexploded.

(3) If, in the opinion of the officer in charge of the testing, the explosive has exploded in a satisfactory manner when fired untamped at the gallery.

9. A shot may be repeated at the discretion of the officer in charge of the testing, if in his opinion there is reasonable ground to believe that a failure was due to any cause unconnected with the explosive.

N.B.—The heaviest charge which may be fired from the gun is 2½ lbs.

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*Appendix B.*

*Fees.\**

		£	s.	d.
For testing new explosive .. .. .		50	0	0
For testing altered explosive .. .. .		30	0	0
For second trial (if allowed) .. .. .		30	0	0
For each experimental shot .. .. .		1	0	0

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APPENDIX III.

MEMORANDUM ON THE STORAGE OF EXPLOSIVES AT MINES.

Under the Coal Mines Act, 1911, and the Explosives in Coal Mines Order of the 21st May, 1912,† all explosives used at a mine to which the Act applies must be provided by the owner of the mine and a suitable place above ground must be provided for the storage of the explosive. A suitable place has also to be provided conveniently near the entrance of the mine, for the storage of the unused explosive which the workmen are required to bring out at the end of each shift.

In making provision for the storage of explosive, the mine owner or manager has to comply with the requirements of the Explosives

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\* These fees have been increased by 20 per cent. until further notice.

† This Order was superseded by the Explosives in Coal Mines Order of September 1, 1913, *see* page 66.

Acts, 1875 and 1923, and the Orders made under those Acts, and the present memorandum is designed to explain briefly the nature of those requirements and the methods by which the storage accommodation required can be provided to suit the varying circumstances of different mines.

There are three ways in which explosive in sufficient quantity for mining purposes may be kept :—

1. In premises registered with the Local Authority.\*
2. In a "store" licensed by the Local Authority.\*
3. In a magazine licensed by the Secretary of State.

1. This method can be adopted where small quantities of explosive only are in store at any one time, and is often a suitable way of providing storage for unused explosive brought out of the mine when the main store is not conveniently near the mine entrance. The amount of explosive kept in this way must not exceed 200 lbs. of gunpowder, or 60 lbs. of other explosive or of mixed explosives. The conditions to be observed are contained in Section 22 of the Act and Order in Council No. 16† which should be consulted, but the main provisions are as follows :—

The place of storage must be registered with the Local Authority, and (if explosive other than gunpowder is kept) the manager or other responsible person having charge of the premises must hold a certificate from the Police that he is a fit person to keep the explosives.

The storage place must be a building substantially constructed of brick, stone, iron or concrete or an excavation made in solid rock, earth, or mine refuse not liable to ignition. It must be entirely appropriated‡ to the keeping of explosive and must be detached from a dwelling-house. It must also be situated at a safe distance (say 15 yards, or less if suitable protection intervenes) from any highway, street, public thoroughfare or public place, but there are no further requirements as to the maintenance of certain distances between the storage place and other buildings and works in the vicinity.

The precautions mentioned in paragraphs 8, 11 and 13 of Appendix II. to this Memorandum must be observed.

2. The second method provides for larger quantities, and includes four different kinds of "Stores," named Divisions A, B, C and D. The quantity of explosive that may be kept in a store of Division A is 300 lbs. of gunpowder, or half that quantity of

\* See Appendix I.

† Copies of this Order may be obtained, price 1d. each, through any bookseller, or directly from H.M. Stationery Office at the addresses given on the title page of this volume.

‡ Very small quantities, however, viz., up to 50 lbs. of gunpowder or 15 lbs. of other explosive or of mixed explosives, may be kept in a building not so appropriated, provided they are kept in a substantial receptacle properly closed and secured and exclusively appropriated to the purpose.

other explosives, or if both gunpowder and other explosives are kept,  $\frac{1}{2}$  lb. of other explosive may be kept in lieu of each pound of powder not kept. The quantities of explosive allowed in stores of Divisions B, C and D are 1,000 lbs., 2,000 lbs. and 4,000 lbs. respectively of gunpowder, and of other explosives on the same scale as in the case of Division A, *i.e.*,  $\frac{1}{2}$  lb. of other explosive for each pound of powder not kept. The conditions which apply to these stores are contained in Order in Council No. 6,\* and a summary of them is given in Appendix II.

The most important requirement which mine owners have to consider is that which provides that all stores shall be placed at certain distances from other buildings and works. An important modification in these distances, however, has recently been made which will be of material assistance to mine owners in cases where the surface space at the mine is restricted. By Order in Council No. 6c† it is provided that the distances may, in the case of a store of Divisions B, C and D, be reduced by half provided the protected work is in the occupation of the licensee and is completely screened from the store by a natural or artificial mound of earth, or other suitable material not less than three feet thick at the height of the eaves of the store. Further, it is provided by the same Order in Council, that the distance between a store in any of the four divisions and a mineral or private railway or tramway line worked by the occupier need not be more than 25 yards, if the door or doors of the store be closed and secured when and so long as any locomotive driven by steam is within 50 yards of the store.

3. In cases where larger quantities than those mentioned above are required or where, owing to special local circumstances, it is impracticable to find a suitable place for a store, it will be necessary to provide a magazine under licence of the Secretary of State. In the first instance, it is advisable to communicate with His Majesty's Inspectors of Explosives, Home Office, London, S.W. 1, who will be prepared to consider the special requirements of each case and to recommend such conditions to suit the circumstances as may safely be entertained. The quantity of explosive that may be kept in a magazine is limited only by the provisions of the licence.

Workmen's canisters may be filled and kept in any place of storage provided as above.

Home Office, Whitehall,  
November, 1912.

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\* See † on preceding page.

† Copies of this Order (S.R. & O., 1909, No. 753, dated June 28, 1909), may be obtained, price 1d. each, through any bookseller, or directly from H.M. Stationery Office at the addresses named on the title page of this volume

*Appendix I.*

## LOCAL AUTHORITIES.

1. *England and Wales.*

The Town Council is the Local Authority in any County Borough.

Quarter Sessions Borough (other than a County Borough) having over 10,000 inhabitants according to the Census of 1881.

\*Borough having over 10,000 inhabitants according to the Census of 1881, for which a special Order has been made under Section 68 of the Explosives Act.

Elsewhere the Local Authority is the County Council which has, however, power of delegation under the Act to

- (a) a Committee of its own body,
- (b) an Urban or Rural District Council,
- (c) the Justices in Petty Sessions.

The Councils of County Boroughs have the same power of delegation as County Councils.

2. *Scotland.*

In any Royal or Parliamentary Burgh the Local Authority are the Magistrates and Town Council.

Elsewhere the Local Authority is the County Council which has, however, power of delegation to a Joint Committee of its own body and of any Town Councils within the County.

In Duns and Govan, for which a special Order has been made under Section 112 of the Act, the Police Commissioners are the Local Authority.

3. *Ireland.*

In any Urban District the Local Authority is the Urban District Council, elsewhere it is the County Council.

(In any harbour, the Harbour Authority is the Local Authority.)

*Appendix II.*

## SUMMARY OF THE MAIN REQUIREMENTS AS TO LICENSED STORES.

1. The store must be licensed by the Local Authority in the name of the occupier, either for gunpowder or mixed explosives.

2. The licence must be renewed annually.

3. The store must not be situated below ground in any mine or quarry, or in any tunnel, or other underground place in which mine, quarry, tunnel, or underground place any work is being carried on, or in which any persons are employed, or in any place opening into, from, or out of such mine, quarry, tunnel, or underground place, or in communication therewith.

4. All buildings and places adjoining each other and occupied together are deemed to be one store, and must accordingly be included in one licence

\* These Boroughs are the following :—Accrington, Ashton-under-Lyne, Boston, Chepping Wycombe, Chesterfield, Crewe, Dewsbury, Durham, Hartlepool, Heywood, Hove, Kendal, Kidderminster, Kingston-on-Thames, Leamington, Louth, Macclesfield, Morley, Neath, Newcastle-under-Lyne, Ramsgate, Reigate, Ryde, St. Albans, Stafford, Truro, Tunbridge Wells, Weymouth and Melcombe Regis, and Wrexham.

5. The following distances must be maintained from the store :—

<i>Protected Works of Class 1.</i>	<i>Protected Works of Class 2.</i>
Dwelling-house Shop Room, of any kind Workshop, of any kind *Mineral or private railway, whether or not worked by steam Furnace or kiln Fire for boiler, machine or manufacturing purpose Magazine for explosive Store for explosive Registered premises Highway, public footpath, or promenade. Open place of resort for the public, or for persons carrying on any trade or business. Canal or navigable water. Dock, river-wall or sea-wall. Pier or jetty. Reservoir.	Dwelling-house Shop Room, of any kind Workshop, of any kind Mineral or private railway, whether or not worked by steam Furnace or kiln Fire for boiler, machine or manufacturing purpose Magazine for explosive Store for explosive Registered premises Factory. Public roadway. Church or Chapel. University, college or school. Hospital, or public institution. Town Hall or Court of Justice. Theatre or covered market. Building where persons are accustomed to assemble. Government public building.

In occupation of licensee, or with consent in writing of occupier.

Without the consent of the occupier.

Store belonging to	Distances from Protected Works of Class 1.†	Distances from Protected Works of Class 2.
Division A ... ..	25 yards	50 yards
†Division B ... ..	50 yards	100 yards
†Division C ... ..	75 yards	150 yards
†Division D ... ..	100 yards	200 yards

6. Where a store is licensed for gunpowder, only gunpowder, whether or not intended for blasting, and gunpowder cartridges not containing their own means of ignition may be kept.

When any other explosive is kept, with or without gunpowder, <sup>s of eac</sup> must be licensed for mixed explosives. <sup>mstanc</sup>

7. Detonators must be kept effectively separated from other explosive. If a considerable quantity of detonators is required, they may be kept in an annexe to the store, which will be regarded as part of the store (the annexe should be of the same construction as the store and at least a few feet away from it); or in a place registered in accordance with the method first mentioned in the memorandum (the colliery office may be registered for the purpose if the gross weight of the detonators does not exceed 15 lbs. and the detonators are kept in a locked box or drawer exclusively appropriated to the purpose: *see* footnote to page 123). For a few hundred detonators, however, a cupboard in the porch of the

\* The store shall not be required to maintain a greater distance than 25 yards from a mineral or private railway worked by the occupier, provided that the door or doors of the said store be kept closed and secured when and so long as any locomotive driven by steam is within a distance of 50 yards of the store. (O. in C. No. 6c, S.R. & O. 1909, No. 753.) "Mineral or private railway" includes a tramway or incline.

† When the "protected work" is in the occupation of the licensee, and is completely screened from the store by a natural or artificial mound of earth or other suitable material not less than 3 feet thick at the height of the eaves of the store, the distances may be reduced by one-half. (O. in C. No. 6c, S.R. & O. 1909, No. 753.)

store, so arranged that it cannot be opened unless the inner door of the store is closed, may be allowed. For weights of detonators, *see* Table at the end of the Summary.

8. When any explosive which is liable to be dangerously affected by water is kept, due precautions must be taken to exclude water from the store. This applies specially to ordinary dynamite, which is liable to exude nitro-glycerine under the influence of water.

9. The store must be well and substantially built of brick, stone or concrete, or excavated in solid rock, earth or mine refuse not liable to ignition, and so made and closed as to prevent unauthorised persons having access thereto, and to secure it from danger from without. It will be remarked that not only must the store be built of masonry or formed by excavation, but its construction must be substantial and such as to render it not liable to unlawful entry, or to danger from accident or from evilly disposed persons; accordingly, it should be provided with good doors, and all ventilators, windows, keyholes and other openings should be so closed or protected as to satisfy all reasonable requirements of security.

10. If licensed under Divisions B, C or D, and made otherwise than by excavation, the store must have attached thereto a sufficient lightning conductor.

11. The interior of the store, and the benches, shelves and fittings therein must be so constructed or so lined or covered as to prevent the exposure of any iron or steel, and the detaching of any grit, iron, steel or similar substance in such manner as to come into contact with the explosive. This provision can best be complied with by lining the store with wood or other suitable material. A wooden lining will be easier to keep clean if painted or varnished, and will last much longer if the planks are thus treated on both sides before being placed in position. The floor must be of wood or asphalt free from grit. All nails should be preferably of copper, brass or zinc; but if iron nails are used, they should be counter-sunk and puttied over. All exposed ironwork in the building should be efficiently covered with wood, leather or zinc, or should be thickly painted.

12. All tools and implements used in the store must be of wood, copper, brass or some soft metal or material, or be covered with some safe and suitable material.

13. The interior, benches, shelves and fittings of the store must, "so far as is reasonably practicable," be kept free from grit and otherwise clean.

14. Due provision must be made by the use of suitable shoes or otherwise for preventing the introduction into the store of grit or of any exposed iron or steel. At every store there should be a visible boundary, whether formed by a step or by a vertical "footboard" (about 4 inches high), or otherwise, beyond which the dirty iron-nailed boots should never pass, except directly into over-boots of leather (or other suitable material) made without any iron; and these over-boots should in their turn never be placed outside the "clean" boundary (the word "clean" being here used in a technical sense, implying the exclusion of all grit), or be deposited where they can take up grit. Over-boots made very large (so as easily to take in the whole boot and lower part of the trousers) are more convenient than those which necessitate removing the ordinary boots, or which entail trouble and delay in putting on.

15. Due provision must be made by the use of suitable working clothes without pockets, searching, and otherwise, or by some of such means for preventing the introduction into the store of fire, lucifer matches, or any substance or article likely to cause explosion or fire, or any iron, or steel, or grit. (N.B.—The use of "an artificial light of such construction, position or character as not to cause any danger of fire or explosion" is permitted.)

This important provision can best be satisfied by requiring the store-keeper to wear a pocketless magazine suit, and forbidding other persons

to enter. But as this is not always practicable or convenient, the store-keeper should be required not only habitually to search his own pockets, but also the pockets of any other persons who may enter the store, in order to detect and remove therefrom any dangerous articles, among which may be included a pipe, as this is sometimes placed in the pocket before it has been properly extinguished.

16. No person may smoke in any part of the store.

17. No person under the age of 18 may be employed in or enter the store except in the presence and under the supervision of some person of the age of 21 or upwards.

18. No repairs are to be executed to or in any part of the store, except after the store has, so far as is practicable, been cleaned by the removal of all gunpowder and the thorough washing out of the store.

19. The store is to be used only for the keeping of explosive and receptacles, or tools or implements for work connected with the keeping of such explosive.

20. A warning notice to trespassers must be kept conspicuously posted up.

#### Weights of Detonators.

Weights of Detonators.		
Size of Detonator.	Gross Weight per 1,000 Detonators.	Remarks.
No.	Lbs.	
3	3.19	} Not much used.
3a	3.31	
4	3.62	
5	4.23	} Common sizes.
6	4.95	
6½	5.50	
7	7.06	} Not much used.
8	8.66	
9	9.76	
10	10.86	

#### APPENDIX IV.

##### MEMORANDUM ON THE TEST OF SAFETY LAMPS.

1. A safety lamp will be required to pass the official test described in Appendix I to this Memorandum before it is approved by the Board of Trade for the purposes of the Coal Mines Act, 1911.

2. When it is desired to submit a safety lamp to the official test, an application on a form to be obtained from the Mines Department should be forwarded, together with the prescribed fee (*see* Appendix II) to the Under-Secretary for Mines, Dean Stanley Street, Millbank, S.W. 1. On receipt of the necessary authority from the Mines Department the required number of lamps and glasses (*see* Appendix I, paragraph iii) should be forwarded, carriage paid, to Sheffield Railway Station, Yorkshire, and should be addressed—

Mines Department Testing Station.

42, Arundel Street, Sheffield, Yorkshire.



In the case of flame safety lamps a statement showing the nature of the fuel and wick to be used should be sent with the lamps.

Makers should supply the wicks, and they may, if they desire, supply the oil, for the testing of their own lamps.

The apparatus necessary for operating the locks of lamps submitted for testing (including magnetic and compressed air locks) must, if required, be supplied by the applicant ; but he should communicate with the Testing Officer to ascertain what parts (if any) of such apparatus need not be forwarded.

On the conclusion of the test all the lamps except those required to be retained as patterns (usually two in number, unless modifications are submitted under paragraph 5, when the number may be greater) will be repacked and delivered free to Sheffield Station and forwarded from there to the applicant, carriage forward, if so desired.

3. Lamp glasses for flame safety lamps may be submitted to the glass tests separately. When it is desired to do this an application on a form to be obtained from the Mines Department should be forwarded, with the prescribed fee (*see* Appendix II), as above. On receipt of the necessary authority from the Mines Department the required number of glasses (*see* Appendix I, paragraph iii) should be forwarded, carriage paid, to the Sheffield Station, addressed as above.

4. An official description of every type of safety lamp or glass which passes the official tests and is approved by the Board of Trade will be published by the Mines Department in the Lists of Approved Lamps\* and Approved Glasses. Particulars of the composition of glass will not be published or required to be stated by the maker.

Every lamp of a type so approved which is supplied for use in mines to which the Act applies will be required to conform in all particulars with the official description. The description will specify in the case of each type of lamp by what manufacturer and in what factory or factories it is to be made.

Each lamp will be required to have marked upon it in a distinct manner the name of the maker and the name by which the type is designated in the List of Approved Lamps.\*

Every glass of a type so approved which is supplied for use in mines to which the Act applies will be required to be of the same dimensions (within such limits of variation as may be specified in the official description), quality, and composition and made by the same manufacturers as the samples which pass the official tests.

Each flame safety lamp glass will be required to have marked upon it in a distinct manner the mark by which the approved type is designated in the List of Approved Glasses.

5. The official description of an approved type of lamp may be made to include variations on points of detail which do not

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\* For list of Approved Safety Lamps, *see* pages 79-90.

alter the character of the lamp. If it is desired to have such variations included, full particulars should be submitted in the form of application for the test of the lamp. The Testing Officer will decide whether or not the variations constitute a new type or types of lamp which must be separately tested.

6. In the event of its being desired to submit for approval variations in a type of lamp already approved an application (specifying the variations) should be sent to the Mines Department for authority to submit a lamp or lamps containing the variations to the Testing Officer, who will examine them and decide whether or not the variations are of such a nature as to render a fresh test necessary.

7. Flame safety lamp glasses of the same make (that is, made by the same manufacturer and of the same composition and quality) but of differing sizes, may be submitted for test at the same time at reduced fees as provided for in Appendix II, paragraph 8. If it is desired to take advantage of this, the application made in accordance with paragraph 3 above should give particulars of the different sizes which it is desired to submit.

Each size of glass must bear a mark to distinguish it from other sizes, and these marks, with the dimensions to which they refer, will be scheduled in the List of Approved Glasses.\*

8. The approval of the Secretary for Mines on behalf of the Board of Trade will only be given subject to revocation at any time by the Secretary for Mines at his discretion. The approval of a lamp or flame safety lamp glass which is not being supplied for use within one year from the date of approval will, except on special grounds to be allowed by the Secretary for Mines, be revoked. He also reserves the right to direct that lamps or flame safety lamp glasses in actual use in mines shall be submitted to the official test with a view to determining whether they conform in all respects to the approved type and are otherwise safe for use in mines.

9. Manufacturers and their representatives can attend at the Testing Station when their lamps are being officially tested or re-tested.

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#### *Appendix 1.*

(i) The test will be carried out by an officer of the Mines Department with the Testing Apparatus at the Mines Department Testing Station at 42, Arundel Street, Sheffield, Yorkshire.

(ii) The lamp will be examined in respect of its general design, strength and general character of construction, and the following requirements must be met, viz. :—

(1) IN THE CASE OF FLAME SAFETY LAMPS.

(a) It must be provided with double gauzes, or with some other adequate arrangements serving the same purpose. A single

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\* Since a source of danger lies in the use of a glass of the wrong dimensions, it is desirable, in order to avoid the accidental interchange of glasses of different dimensions, that eventually the sizes should be standardised as far as possible.

gauze lamp with a gauze cap will not be regarded as fulfilling this requirement. Every gauze must be of steel or best charcoal-annealed iron wire (or in the case of a lamp used for surveying purposes, copper wire) of not less than 28 S.W.G. (.0148 inch in diameter) with 28 meshes to the lineal inch (784 to the square inch).

- (b) If lamp pillars are used the pillars must be so arranged that a straight line touching the exterior part of the consecutive pillars will not touch the glass.
- (c) The lamp must be so constructed that it will not be possible to put together the component parts of the lamp without the gauze.\*
- (d) The lamp must be provided with an efficient locking device to prevent the oil vessel, glass or bonnet from being removed by unauthorised persons, or loosened to such an extent that the safety of the lamp is impaired. Provision should also be made for taking up the play due to wear of the screw threads.  
*Note.*—Lamps fitted with a screw lock and lamps in which the glass can under reasonable working conditions be loosened by forcing it round in its seating to such an extent that the safety of the lamp is impaired, will not be regarded as complying with this requirement.

(2) IN THE CASE OF ELECTRIC SAFETY LAMPS.†

- (a) No liquid must escape from the battery when the lamp is turned upside down.
- (b) The switch and other electrical contacts must be contained in flame-tight enclosures.
- (c) The lamp must be provided with an efficient locking device to prevent unauthorised persons from tampering with the electrical contacts.

(iii) The number of safety lamps required for carrying out tests will, as a general rule, be as follows :—

Flame safety lamps.. . . . .	10
Electric           "           "           "	5
Safety lamps for special purposes.. . . .	3

When application is made to submit lamps with modifications under paragraph 5 of the Memorandum, the applicant will be notified what number of lamps containing the modifications will be required.

The number of flame safety lamp glasses required for carrying out the test, whether submitted with a lamp or separately, will be as follows :—

- (a) In the case of a single glass lamp . . . . . 40
- (b) In the case of double glass lamps 25 inner and 25 outer glasses.

*Note.*—If a lamp is submitted for test fitted with glasses which have already been approved, 15 glasses only will be required (for the mechanical tests of the lamp).

\* This requirement does not apply to lamps introduced in mines before 30th June, 1914, provided they are so constructed that on an external examination when the lamp is locked and ready for use, the absence or presence of the gauze can be readily ascertained.

† The Safety Lamps Order of the 15th May, 1916 (S.R. & O., 1916 No 341), provides as follows :—

"All approved electric safety lamps shall conform to the following requirements, and the description of each lamp is amended accordingly :—

"(a) No celluloid, xylonite, or other material liable to be ignited by the spark on making or breaking contact or on short circuit shall be used in proximity to the terminals :  
 " Provided that as regards lamps taken into use in mines on or before 1st December, 1915, this requirement shall not come into force until 1st January, 1918.  
 "(b) The use of terminals which can be bent over, such as flexible spring terminals, is prohibited."

## (iv) TESTS FOR FLAME SAFETY LAMPS.

Flame safety lamps will be tested in the following manner :—

(a) *Mechanical Tests for Lamps.*

1. The lamp is dropped from a height of 6 feet on to a wooden floor.

The height of 6 feet is measured from the bottom of the lamp which has been fitted together complete with glass, and the lamp is dropped by means of a mechanical arrangement.

This test is repeated five times in succession, the lamp being fitted with a different glass each time. The lamp passes the test if the glass is broken in not more than one of the five tests. Should the glass be broken in two, but not in more, of the tests, the lamp is submitted to five more tests with fresh glasses when, should the glass break in two of them, the lamp will fail to pass the test.

2. A weight of 5 pounds is dropped from a height of 6 feet on to the lamp standing vertically on a wooden platform beneath the weight.

The height of 6 feet is measured between the bottom of the weight and the top of the lamp. The weight is a lead disc, 3 inches in diameter and  $1\frac{1}{4}$  inches thick, and is dropped mechanically.

Should the glass of the lamp be broken, the test is repeated twice with a different glass each time, when one failure of the glass causes the lamp to fail.

3. A weight of 10 pounds, attached to a cord, the other end of which is secured to the bottom of the lamp, is dropped from a height of 6 feet, the lamp being suspended at a height of 7 feet from the ground.

The lamp is gripped by means of brass claws or slung by means of wire rope straps round its upper part, above the standards protecting the glass. A brass platform is fastened to the bottom of the lamp and to the centre of this platform the cord is attached. The weight is a lead disc,  $4\frac{1}{4}$  inches in diameter and  $1\frac{1}{2}$  inches thick; it is dropped mechanically.

This test is repeated three times. If, as the result of any one of these three trials, the security of attachment is found to be defective in any way the lamp will fail to pass.

Tests 1, 2 and 3 are to be made in succession on one lamp. Cracking of the glass will be regarded as a breakage.

(b) *Tests for Glasses.*

1. A weight of 1 pound is dropped by means of a mechanical arrangement from a height of 4 feet on to the lamp glass placed on a wooden floor, the glass being in a vertical position.

The weight is a lead disc,  $2\frac{1}{2}$  inches in diameter and  $\frac{1}{2}$  inch thick.

Twenty glasses of any one kind to be tested; two failures in the twenty will cause the lamp to fail.

2. The glasses are heated in an air bath, in batches of ten, to a temperature of  $212^{\circ}$  Fah., and when at that temperature removed from the bath and plunged into water at a temperature of  $60^{\circ}$  to  $65^{\circ}$  Fah.

The air bath at the testing station consists of a double-walled copper box heated electrically. The external dimensions are 1 foot 5 inches by 9 inches by  $8\frac{1}{2}$  inches high. The internal dimensions are 1 foot 3 inches by  $6\frac{1}{2}$  inches by 6 inches high, the space between the walls being packed with asbestos fibre. The tray upon which the lamp glasses are supported is 1 foot  $2\frac{1}{2}$  inches long and  $5\frac{1}{2}$  inches wide, and it is pierced with holes  $\frac{1}{4}$  inch in diameter; it is fitted with wooden slats upon which the lamp glasses rest.

Of the ten glasses heated in each batch five are placed horizontally on the tray and five vertically. After heating, the tray and glasses together are plunged into water contained in a bath so that the glasses are completely immersed.

Twenty glasses of any one kind to be tested, two failures in the twenty will cause the glass to fail.

In the case of lamps having two glasses the outer glass will be tested mechanically only and the inner glass by heating only.

(c) *Photometric Test.*—The lamp is required to give a minimum candle-power of 0·30, as determined by a pentane standard, during a period of 10 hours.

(d) *Tests in an Explosive Mixture.*—(1) In a still atmosphere. A lamp which has passed the mechanical tests is placed, with a fresh glass if necessary, in an inflammable atmosphere (the composition of which shall be such as the officer carrying out the test may select) in a gas chamber. An ignition exterior to the lamp will cause the lamp to fail.

(2) In a gallery. A lamp which has passed the mechanical tests, but fitted with a fresh glass if necessary, is tested in horizontal and inclined currents in an explosive mixture at a maximum velocity of about 1,200 feet per minute.

The duration of each test is two minutes, and the mixture will be, within reasonable limits, the most explosive mixture obtainable with the particular combustible gas or vapour used.

In addition to the above, five other lamps of the same construction, which have not been subjected to the mechanical or other tests, are submitted to the gallery test.

An ignition exterior to the lamp will cause the lamp to fail.

(v) TESTS FOR ELECTRIC SAFETY LAMPS.

Electric safety lamps will be tested in the following manner :—

(a) *Mechanical Tests.*—The lamp is submitted to the first of the mechanical tests specified in the case of the flame safety lamp. The complete lamp will not be required to be submitted to the test, but, at the option of the manufacturer, the battery may be removed and a dummy one of the same weight, provided by the manufacturer, may be substituted.

(b) *Photometric Test.*—The lamp must give a light of not less than 1 candle-power all round in a horizontal plane throughout a period of not less than nine hours.

It must also be capable of giving a light of not less than 1·5 candle-power over an arc of 45 degrees in a horizontal plane.

*Note.*—If a reflector which interferes with the all-round light is used for producing the light of 1·5 candle-power it must be removable.

(c) *Tests in an Explosive Mixture.*—A lamp which has passed the mechanical test is submitted to a test in which the light is switched on and off while the lamp is in an explosive mixture.

(vi) TESTS FOR SAFETY LAMPS INTENDED FOR SPECIAL PURPOSES.

Such lamps will be submitted to the tests given above with such relaxations and modifications as the Testing Officer, after examination of the lamp, may consider proper, subject to an appeal to the Safety Lamp Committee.

*Appendix 2.*

*Prescribed Fees for Testing.*

*A.—Lamps.*

1. For each type of flame safety lamp, including the glass test ..	14
2. For each type of flame safety lamp, without the glass test..	12
3. For each type of electric safety lamp .. .. .	12
4. For each type of safety lamp used for special purposes ..	5
5. When a type of lamp and modifications are submitted together under par. 5 of the Memorandum, an <i>additional</i> fee (which will be assessed by the Testing Officer), proportionate to the amount of work to be done, but not exceeding the fee specified above for that type of lamp, will be charged.	

6. When modifications of a type of lamp already approved are submitted under par. 6 of the Memorandum, a fee (which will be assessed by the Testing Officer), proportionate to the amount of work to be done, but which will not be less than £2 or more than the fee specified above for that type of lamp, will be charged.

*Note.*—In the case of lamps or modifications of lamps, the testing of which, owing to unusual features of design or construction, involves special work of a kind not contemplated by the above scale, such additional fee will be charged as the Testing Officer may consider sufficient to cover the extra expenses of the test in the particular case.

B.—Glasses.

7. For each make and size of glass . . . . . £  
2  
*Note.*—This fee will, in the case of glasses for use in double glass lamps, cover the test for both glasses.
8. When glasses of the same make but of different sizes are submitted together in pursuance of par. 7 of the Memorandum, a fee (which will be assessed by the Testing Officer) of not less than £2 or more than £6, according to the number of tests necessary to cover all the sizes, will be charged.

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APPENDIX V.

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MEMORANDUM ON THE TEST OF RESCUE APPARATUS

*“Rescue Apparatus” in this Memorandum includes only the self-contained breathing apparatus required to be provided at rescue stations and mines by the General Regulations under the Coal Mines Act, 1911, in regard to rescue work.*

1. A rescue apparatus will be required to pass the official tests described in Appendix I to this Memorandum before it is approved by the Board of Trade for the purposes of No. 11 of the General Regulations under the Coal Mines Act, 1911, dated 30th July, 1920.\*

2. When it is desired to submit a rescue apparatus to the official tests, an application on a form to be obtained from the Mines Department should be forwarded to the Under-Secretary for Mines, Dean Stanley Street, Millbank, S.W. 1, with the prescribed fee (*see Appendix II*†) by cheque made payable to *The Accounting Officer, Mines Department*, and crossed “Bank of England, a/c Paymaster-General.” On the receipt of the necessary authority from the Mines Department the required apparatus and appurtenances (*see 3, p.140*) should be forwarded, carriage paid, to the Doncaster and District Rescue Station, Wheatley, Doncaster, and should be addressed—

Mines Department Rescue Apparatus Testing Officer,  
Doncaster and District Rescue Station,  
Wheatley, Doncaster.

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\* S.R. & O., 1920, No. 1423, *see* page 54.

† *See* page 146.

3. Two identical sets of the apparatus to be tested, along with such cartridges or chemicals (excepting oxygen or liquid air) as will enable the tests to be carried out, should be sent to the Testing Officer.

The manufacturer should also send such additional parts and additional cartridges or chemicals as the Officer may request.

NOTE.—The apparatus must be provided with facilities for taking samples of air temperatures and pressures as prescribed in Appendix I (*b*) and (*d*). If any doubt arises as to the nature of the facilities required, the Testing Officer should be consulted.

A clear drawing of the apparatus to indicate its manner of working, and complete schedule of parts of the apparatus stating the material of which each is made, and the name by which it is proposed that the apparatus shall be known, must also be submitted.

4. In the event of the manufacturer desiring to make an alteration in an apparatus already approved, application should be made to the Under-Secretary for Mines, Dean Stanley Street, Millbank, S.W. 1, defining the exact nature of the proposed alteration. The Secretary for Mines will then decide whether the proposed change is of so fundamental a character as to necessitate complete re-testing, or whether it necessitates re-testing in part only, or to a modified extent, or whether the alteration may be allowed without further testing.

5. The approval of any type of apparatus will be limited to the apparatus actually made by the manufacturer submitting it for approval. Any other manufacturer intending to make the same type of apparatus must submit the apparatus as made at his works for separate approval in accordance with the conditions herein set forth.

6. Should an apparatus fail to comply with the requirements, the two sets of apparatus will be returned to the manufacturer; in the event of an apparatus receiving approval, one set will be retained by the Testing Officer on behalf of the Mines Department.

In the case of failure of an apparatus, or part thereof, a report will, if desired, be furnished to the manufacturer setting forth the cause or causes of failure.

The report on an apparatus which has failed will not be made public by the Mines Department.

7. A nose clip must be so constructed, or so attached, as to afford reasonable security against accidental displacement through a chance blow, or through the wearer stumbling. It must not tend to slip when the nose becomes moist with perspiration.

8. The tests which a face mask will be required to pass before it can be approved will be prescribed by the Testing Officer.

9. Approved rescue apparatus must, before leaving the manufacturer's works, be stamped or otherwise clearly marked with (1) the manufacturer's name and serial number; (2) the

inscription " Mine Rescue Apparatus : Approved for use in Mines in the United Kingdom," and (3) the date of approval.

Any part of rescue apparatus which has been separately approved must also be stamped or otherwise clearly marked in accordance with any directions given by the Testing Officer.

10. Approval may be cancelled in respect of an apparatus which is found to be made of inferior materials or to be of inferior workmanship than the approved model, or not to comply with any condition specified in the official description.

11. Manufacturers and their representatives will be allowed to attend at the tests of an apparatus or parts thereof.

12. An official description of every type of rescue apparatus which passes the official test, and is approved by the Board of Trade, will be published by the Mines Department in the Lists of Approved Rescue Apparatus.

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#### *Appendix I.*

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A rescue apparatus will be required to pass the following tests, which will be carried out at the Doncaster and District Rescue Station, Wheatley, Doncaster, by the Mines Department Testing Officer :—

(a) *General Construction and Serviceableness.*—The apparatus must be constructed of the best available materials and be of mechanical strength sufficient to withstand the usage it is likely to receive in actual service. The parts must be arranged with due regard to the comfort of the wearer and must be designed on correct mechanical principles. The apparatus must not unduly impede the wearer when he is walking in a crouching position or when he is crawling. The arrangement must be such that the parts can easily be tested, inspected and repaired.

In the case of compressed oxygen apparatus, a gauge must be provided to enable the reserve of oxygen to be read at any time. The gauge must be within view of the wearer, and, if it is connected to the cylinder by a flexible tube, there must be a cock or other efficient means of shutting off the gauge and flexible tube from the cylinder. Such apparatus must have one cylinder only, and the cylinder valve must be either so constructed that it cannot accidentally be closed, or provided with a suitable locking device serving that purpose. There must be a by-pass to permit of a free flow of oxygen from the cylinder to the breathing circuit of the apparatus independent of the reducing valve. A relief valve (preferably operating automatically) must be provided on the breathing circuit, and if it be automatic in action, the construction of the apparatus must be such as will prevent the bag being accidentally squeezed flat.

Unless an apparatus complies with these general requirements it will be rejected without further examination.

(b) *Purifier Test.*—If the material used for absorbing carbon dioxide is contained in a sealed canister or cartridge, the latter must be so constructed that the absorbent cannot be so disturbed by shaking as to impede the flow of air through it, or create open passages or short-circuiting within the cartridge. Unless the design of the cartridge is such as definitely to preclude any such movement of the absorbent, three sealed cartridges will be subjected to shaking or vibration for three minutes and then tested separately by either (1) passing through each of them, in an intermittent flow, air saturated at blood temperature and containing carbon dioxide of a volume and proportion to represent the expiration of an average man walking at 4 miles per hour for a period, in each case, of two hours, or (2) by attaching each cartridge to an approved rescue apparatus and



subjecting it to the endurance test as set forth in (d) below. Measurements of resistance (by water-gauge) and samples of the air discharging from the cartridge will be taken at intervals. The purifiers will be regarded as having satisfied the test if the highest recorded resistance due to the purifier alone is under 2 inches of water column, and if the highest CO<sub>2</sub> proportion in the air passing from the purifier is under 2 per cent.

This test will not be applied to a purifier forming part of a liquid air apparatus in which the supply of fresh air to the wearer is so copious that the greater part of the expired air discharges to waste without passing through the cartridge.

(c) *Test of Expiration and Inspiration Valves.*—If the valves on the breathing circuit possess novelty of design or arrangement, tests will be made to ascertain their efficiency. A valve will not be regarded as satisfactory if its slip in any position exceeds 20 per cent. when the volume being respired is 40 litres per minute.

(d) *Endurance Test.*—This test will be performed four times, namely, twice with each of the models submitted by the manufacturer, and the apparatus will be worn by different persons on each occasion. Persons accustomed to using rescue apparatus will be selected to wear the apparatus.

The person wearing the complete apparatus will walk at a regular rate of 4 miles per hour on the level for a period of two hours, with rest intervals of not more than five minutes each at the expiration of 30, 60, 90, and 105 minutes, when samples of air and thermometer and other readings may be taken. Samples and readings will also be taken at the end of the two-hour period.

In the case of an apparatus dependent on a uniform oxygen delivery, the rate of delivery will be set at 2 litres per minute before the commencement of the test, and the rate will again be measured at the end of the test. Before an apparatus is put on it will be tested for leakage and any leak remedied. An examination for leakage will also be made after the two-hour period. Unless the apparatus derives its oxygen supply from the evaporation of liquid air, only oxygen of at least 98·5 per cent. purity will be used in this and the subsequent tests, and the cylinder will first be washed out with such oxygen before charging.

Samples of air from the inspiratory tube of the breathing circuit will be taken at intervals and analysed forthwith for carbon dioxide and oxygen. The temperature of the inspired air and the cylinder pressure will also be recorded at each interval.

An apparatus will not be regarded as satisfactory unless (1) it proves itself, on each of the four endurance tests, to be able to meet the wearer's requirements for the full period of two hours; (2) the highest CO<sub>2</sub> percentage in the samples taken does not exceed 2 per cent.; (3) the highest temperature of the inspired air is not more than 20° C. (36° F.) in excess of the temperature of the atmosphere at the time the maximum reading was taken; and (4) the highest resistance of the apparatus as a whole (measured immediately at the end of the two-hour period) does not exceed 3 inches of water when the rate of flow is 85 litres per minute.

(e) *Training Gallery Test.*—This test will be undertaken in irrespirable air in a suitable gallery. Two men, each equipped with the apparatus, will work two hours in the gallery. The men will be required to undertake a definite programme involving varied exertion for two hours. The programme may include weight lifting, weight carrying, loading a mine tub, tramping, carrying a dummy figure on a stretcher, crawling through low narrow openings, and sawing and setting of timber. The test is mainly to determine the degree of security and comfort attainable when wearing the apparatus and when performing some of the common tasks of mining, and the nature of the work will be in all cases arranged by the Testing Officer as may be deemed by him most suitable to reveal the defects or limitations of the particular apparatus.

*Appendix II.***Prescribed Fees for Testing.**

1. For each type of rescue apparatus .. .. .	£
2. For each type of face mask .. .. .	30
3. For each type of nose clip .. .. .	3
4. When modifications of a type of apparatus already approved are submitted under paragraph 4 of the Memorandum, a fee (which will be assessed by the Testing Officer) proportionate to the amount of work to be done but not exceeding the fee specified above for that type of apparatus will be charged.	3

*Note.*—In the case of a type of apparatus or modification of a type the testing of which, owing to unusual features of design or construction, involves special work of a kind not contemplated by the above scale, such additional fee will be charged as the Testing Officer may consider sufficient to cover the extra expense in the particular case.

## APPENDIX VI.

## RESCUE WORK.

## I.—SCHEMES OF TRAINING AND PRACTICE APPROVED BY THE SECRETARY OF STATE.

I hereby approve the following Schemes of training and practice for the purposes of the General Regulations relating to rescue work made under the Coal Mines Act, 1911 :—

## PART I.—SCHEME UNDER GENERAL REGULATIONS OF 19TH MAY, 1914.\*

*(a) Central Rescue Corps.*

The course of training shall consist of instruction and practices as hereinafter set out, and shall be continued until all the individuals comprising the corps are reported by the instructor to be efficient :—

(a) Instruction as to (i) the construction, use, repair and maintenance of the type or types of breathing apparatus provided for the corps, and of smoke helmets ; (ii) the use of methods and apparatus for reviving men ; (iii) the reading of mine plans and (iv) the properties and detection of noxious and inflammable gases which may be found in coal mines.

(b) Practices—not less than twelve in number for each member—with breathing apparatus under conditions so devised as to represent those likely to be encountered in underground operations

\* S.R. & O., 1914, No. 710, see page 49.

requiring the use of breathing apparatus. In respect of these practices the following rules shall apply :—

(1) The practices shall be carried out by at least five members of the corps at one and the same time.

(2) The training shall commence with practices carried out in ordinary air and shall progress gradually to practices carried out in a hot or irrespirable atmosphere.

(3) Each practice shall last at least two hours (unless in the opinion of the instructor it is desirable, in the interests of safety, to curtail the practice in respect of any member of the corps, or of the corps as a whole), and at some of the practices the breathing apparatus shall be worn continuously during the practice.

(4) The practices shall comprise the following operations :—

(a) Raising, by means of a rope and pulley, a weight of 56 lbs. to a height of six feet.

(b) Walking continuously at a fair pace for half-an-hour.

(c) Building and removing temporary stoppings of stone, brick, sandbags, brattice cloth, or other materials, and carrying the materials required for the same over a distance of at least 10 yards.

(d) Removing débris in confined spaces as representing the clearing of a fall of roof.

(e) Setting timber or other roof supports.

(f) Carrying, pushing or pulling on a stretcher a live person or dummy body weighing 150 lbs. along the length of the gallery, and through an opening 2 feet high by 3 feet wide and 4 yards long.

(g) The rapid establishment of telephonic communication.

(5) A record shall be kept of the date and character of each practice attended by a member of the corps, and the condition of each man after the practice, and, if anything abnormal is observed, it should be stated whether it is due to a defect of the apparatus or to the man himself.

(b) *Men from Individual Mines.*

The course of training shall consist of instruction and practices as hereinafter set out, and shall be continued until the individual is reported by the instructor to be efficient :—

(a) The same instruction as in the scheme for the Central Corps.\*

(b) Practices with breathing apparatus under conditions so devised as to represent those likely to be encountered in underground operations requiring the use of breathing apparatus. In respect of these practices the following rules shall apply :—

(1) Each man shall undergo at least twelve practices in the first year. The training shall commence with practices carried out in ordinary air and shall progress gradually to practices carried out in a hot or irrespirable atmosphere.

\* See Part I (a), page 146.

Not more than eight nor less than five men shall take part in any practice, but if five men do not attend on any occasion the number may be made up by members of the Central Corps.

(2) Each practice shall last at least 2 hours (unless in the opinion of the instructor it is desirable, in the interests of safety, to curtail the practice in respect of any member of the set, or of the set as a whole), and at some of the practices the breathing apparatus shall be worn continuously during the practice.

(3) In the case of men coming from mines where smoke helmets are kept, two additional practices with smoke helmets shall be given.

(4) The practices shall comprise the same operations as are specified above for the Central Corps.\*

(5) After being reported to be efficient each man shall undergo at least one practice with breathing apparatus each quarter, which shall be carried out in a hot or irrespirable atmosphere.

(6) A record shall be kept of each person undergoing training or practice, the date and character of each practice attended, and the condition of each man after the practice, and, if anything abnormal is observed, it should be stated whether it is due to a defect of the apparatus or to the man himself.

## PART II.—SCHEME UNDER THE GENERAL REGULATIONS OF JULY 10TH, 1913.†

The course of training shall consist of instruction and practices as hereinafter set out, and shall be continued until all the members of the brigade are reported by the instructor to be efficient :—

(a) Instruction in the subjects mentioned in Regulation 140 (d) (iii).‡

(b) Practices—not less than twelve in number for each member—with breathing apparatus under conditions so devised as to represent those likely to be encountered in underground operations requiring the use of breathing apparatus. In respect of these practices the following rules shall apply :—

(1) The practices shall, as far as possible, be carried out by each brigade as such, *i.e.*, by all members of the brigade at one and the same time.

(2) The training shall commence with practices carried out in ordinary air, and shall progress gradually to practices carried out in a hot or irrespirable atmosphere. Each practice shall last at least two hours (unless in the opinion of the instructor it is desirable, in the interests of safety, to curtail the practice in respect of any member of the brigade or the brigade as a whole), and at some of the practices breathing apparatus shall be worn continuously during the practice.

(3) The practices shall comprise the same operations as are specified in Part I for a Central Rescue Corps.\*

\* See Part I (a), page 146.

† See Regulation 140 (d) (i), page 35.

‡ See page 35.

(4) A record shall be kept of each person undergoing training, the date and character of each practice attended, and the condition of each man after the practice, and, if anything abnormal is observed, it should be stated whether it is due to a defect of the apparatus or to the man himself.

*R. McKenna,*

One of His Majesty's Principal  
Secretaries of State.

Home Office,  
18th January, 1915.

II.—TEST FOR LEAKAGE OF BREATHING APPARATUS, PRESCRIBED  
BY THE SECRETARY OF STATE.

In pursuance of No. 14 of the General Regulations made under the Coal Mines Act, 1911 and dated 30th July, 1920,\* I hereby prescribe that the test for leakage to be used for the purposes of that Regulation shall be as follows :—

The apparatus before being taken below ground shall be completely immersed in water fully distended and (except in the case of apparatus supplied with liquid air or oxygen) with the oxygen supply turned on ; and while so immersed shall be well shaken and shall be closely examined in every part for leakage by the Superintendent of the Rescue Station or by one of the Rescue Station Instructors or by the leader of the Brigade.

*E. Shortt,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
21st August, 1920.

III.—TESTS FOR BREATHING APPARATUS, PRESCRIBED BY THE  
SECRETARY OF STATE.

In pursuance of Nos. 15 and 16 of the General Regulations made under the Coal Mines Act, 1911, and dated 30th July, 1920,\* I hereby prescribe that the test to be used for the purposes of these Regulations be as follows :—

(a) the apparatus shall be tested for leakage in the manner prescribed for the purposes of Regulation 14 ;

\* S.R. & O., 1920, No. 1423, see page 54.

- (b) in the case of apparatus supplied with oxygen under pressure the pressure in the oxygen cylinder shall be observed ;
- (c) in the case of apparatus supplied with oxygen under pressure the rate of delivery of the oxygen shall be measured by a flowmeter and where that rate is capable of being adjusted by the wearer of the apparatus, it shall be measured over the whole range of adjustment ;
- (d) in the case of a relief valve which operates automatically, the pressure at which it discharges shall be measured ;
- (e) the apparatus shall be carefully examined in respect of its general condition and particular attention should be given to any delicate parts such as the reducing valve.

*E. Shortt,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
21st August, 1920.

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IV.—PHYSICAL AND MEDICAL TESTS PRESCRIBED BY THE SECRETARY OF STATE FOR MEMBERS OF RESCUE CORPS AND RESCUE BRIGADES.

In pursuance of No. 18 of the General Regulations made under the Coal Mines Act, 1911, and dated 30th July, 1920,\* I hereby prescribe that the physical and medical test to be used for the purposes of that Regulation shall be as follows :—

- (a) the person to be tested shall undergo some form of hard physical exertion† for not less than 15 minutes and shall not be passed unless he is found by the superintendent of the station to have sustained the exertion without distress or undue fatigue.
- (b) he must be certified by a duly qualified medical practitioner after thorough examination to be free from any organic disease or weakness and to be fit for undertaking rescue work in a mine.

*E. Shortt,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
21st August, 1920.

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\* S.R. & O., 1920, No. 1423, *see* page 59.

† It is suggested that ability to walk or run a distance of 1½ miles in 15 minutes might be regarded as a suitable test for this purpose.

V.—LIST OF SOCIETIES OR BODIES APPROVED BY THE BOARD OF TRADE FOR THE PURPOSE OF GRANTING CERTIFICATES OF PROFICIENCY IN FIRST AID.†

The Secretary for Mines is advised that only Certificates obtained subsequently to the date of approval can be considered as qualifying for the purposes of the Regulations and Rules.

Name of Society or Body.	Date of Approval.
Armstrong College, Newcastle-on-Tyne.	21st November, 1921.
Birmingham University.	5th June, 1915.
British Red Cross Society.	11th May, 1915.
Glamorganshire Education Committee.	2nd February, 1915.
Heriot-Watt College, Edinburgh.	9th February, 1915.
St. Andrew's Association.	10th July, 1913.
St. John Ambulance Association.	10th July, 1913.

VI.—LIST OF BREATHING APPARATUS APPROVED FOR USE IN MINES AND AT CENTRAL RESCUE STATIONS.‡

N.B.—The approval of any apparatus applies only to apparatus of the type which conforms in every respect to that submitted to the official tests; but in the case of the apparatus marked \* the manufacturers have been authorised to convert to the approved type apparatus of similar name but differing in detail which was in use prior to the date of approval.

Submitted for Test by—	Name of Apparatus.	Date of Approval.
Siebe, Gorman and Co., Ltd.	*Proto	20th Dec., 1921.
Mining Engineering Co., Ltd.	Meco-Briggs	27th Feb., 1922.
American Atmos Corporation.	Paul	27th Feb., 1922.
Rotherham and District Rescue Station Board.	Rotherham	21st June, 1922.
Guest & Chrines, Ltd.	Blackett's Aero-phor Mills	} 27th March, 1923.
	Brown	
Mining Engineering Co., Ltd.	Meco	13th July, 1923.
Mine Safety Appliances Co.	Gibbs	13th July, 1923.
Guest & Chrines, Ltd.	Brierley	9th Aug., 1923.
H. & B. Draeger	Draeger No. 2 (1921 Model)	26th July, 1924.
"	Draeger (1924 Model)	11th Dec., 1925.

† See No. 148 of General Regulations dated July 10, 1913, page 38; No. 1 (a) of the General Regulations dated May 19, 1914, page 49; Regulation 24 of the General Regulations dated July 30, 1920, page 60; and Rule 1 of the Rules made by the Board for Mining Examinations as to the Qualification of Applicants for First and Second Class Certificates of Competency, page 97.

‡ See No. 11 of General Regulations dated July 30, 1920, page 58, and the Breathing Apparatus Order of the 7th February, 1924 (S.R. & O., 1924, No. 133).

APPENDIX VII.

PRECAUTIONS AGAINST COAL DUST.

I.—TEST PRESCRIBED BY THE BOARD OF TRADE, FEBRUARY 14, 1921, FOR DETERMINING THE AMOUNT OF COMBUSTIBLE MATTER IN DUST MIXTURES WHICH CONTAIN CARBONATES.  
1921. No. 200.

In pursuance of No. 4 of the General Regulations made under the Coal Mines Act, 1911, and dated 30th July, 1920,\* the Board of Trade hereby prescribe that the following procedure shall be adopted for the purpose of determining the amount of combustible matter in samples of dust mixture which contain carbonates, in lieu of the procedure prescribed by paragraph (c) of the said Regulations :—

1. A weighed quantity of the dried dust shall be heated to a temperature high enough to ensure complete decomposition of the carbonates,† in an open vessel, until it no longer loses weight : and the percentage loss of weight shall be determined.

2. A weighed quantity of the dried dust shall be treated with dilute acid in a suitable apparatus and the percentage loss of weight due to the evolution of carbonic acid gas shall be determined.

3. The difference between the two percentage losses of weight so determined, shall be reckoned as the percentage of combustible matter for the purpose of the test.

*W. C. Bridgeman,*  
Secretary for Mines.

Mines Department,  
46, Victoria Street, S.W. 1.  
14th February, 1921.

II.—TEST PRESCRIBED BY THE BOARD OF TRADE, FEBRUARY 7, 1921, FOR MOIST DUST MIXTURES WHICH CANNOT BE SIEVED.

1921. No. 201.

In pursuance of No. 4 of the General Regulations made under the Coal Mines Act, 1911, and dated 30th July, 1920,\* the Board of Trade hereby prescribe that the following procedure shall be adopted for the purpose of testing the composition of samples of dust mixture which contain such a high percentage of moisture that the mixture cannot be sieved in the manner prescribed by the said regulation :—

\* S.R. & O., 1920, No. 1423, see page 54.

† "The high temperature of a blow-pipe flame is required, and the heating has to be continued during about an hour to ensure complete decomposition of the carbonate." (Sixth Report of the Explosions in Mines Committee. Cd. 7638, p. 12.)



1. The samples collected shall be well mixed and a weighed quantity of the mixture shall be dried at 212° F. The weight lost shall be reckoned as moisture.

2. The dust so dried shall be treated in the manner prescribed by paragraph (b) of the said regulation and the percentage of combustible matter shall then be determined in the manner prescribed by paragraph (c) of the regulation.

*W. C. Bridgeman,*

Secretary for Mines.

Mines Department,  
46, Victoria Street, S.W. 1.  
7th February, 1921.

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III.—TEST PRESCRIBED BY THE BOARD OF TRADE, NOVEMBER 2,  
1921, FOR DUST MIXTURES WHICH CONTAIN GYPSUM.

1921. No. 1657.

In pursuance of No. 4 of the General Regulations made under the Coal Mines Act, 1911, and dated 30th July, 1920,\* the Board of Trade hereby prescribe that the following procedure shall be adopted for the purpose of testing the composition of samples of dust mixture which contain gypsum, in lieu of the procedure prescribed by paragraph (c) of the said Regulations :—

1. A weighed quantity of the dust which has passed through the sieve, as prescribed by paragraph (b) of the Regulation, shall be dried at a temperature not exceeding 275° Fahrenheit, and the weight lost shall be reckoned as moisture. The sample shall then be brought to a red heat in an open vessel until it no longer loses weight. The weight so lost by incineration shall be reckoned as combustible matter for the purposes of the test.

*W. C. Bridgeman,*

Secretary for Mines.

Mines Department,  
46, Victoria Street, S.W. 1.  
2nd November, 1921.

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APPENDIX VIII.

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MANAGERS' AND UNDER-MANAGERS' CERTIFICATES. INSTITUTIONS  
APPROVED FOR THE PURPOSES OF SECTION 9 OF THE COAL  
MINES ACT, 1911.

The Secretary for Mines is advised that only Degrees or Diplomas obtained subsequently to the date of approval can be considered as qualifying for the purpose of the Act.

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\* S.R. & O., 1920, No. 1423, see page 54.

154 APPENDIX VIII :—MANAGERS' AND UNDER-MANAGERS'  
CERTIFICATES.

<i>Name of Institution and Degree or Diploma.</i>	<i>Date of Approval.</i>
Armstrong College, Newcastle-on-Tyne, in respect of its Diploma in Mining.	29th June, 1904.
Birmingham University in respect of its Degree of B.Sc. in Mining and Diploma in Mining.	11th June, 1904.
Cambridge and Birmingham Universities in respect of their Joint Coal Mining Diploma	30th June, 1925.
Durham University in respect of its Degree of B.Sc. in Mining.	21st December, 1903.
Durham University in respect of its Honours Degree of B.Sc. in Mining.	13th March, 1919.
Edinburgh University in respect of its Degrees of B.Sc. and D.Sc. in Mining and Metallurgy.	7th September, 1921.
Glasgow University in respect of its Degree and Diploma in Mining.	28th September, 1904.
Glasgow, Royal Technical College in respect of its Diploma in Mining.	28th June, 1904.
Heriot-Watt College, Edinburgh, in respect of its Certificate in Mining Engineering.	16th January, 1908.
Heriot-Watt College, Edinburgh, in respect of its Diploma in Mining Engineering.	7th March, 1911.
Leeds University in respect of its Degree of B.Sc. in Mining and Diploma in Mining.	21st November, 1904.
London University in respect of its B.Sc. Degree in Mining for Internal Students, subject to the Degree being endorsed by the University with a certificate of four months' practical experience in a mine.	9th June, 1905.
London University in respect of its Degree of B.Sc. in Mining for External Students.	7th August, 1906.
Manchester. Victoria University in respect of its Degree and Certificate in Mining.	14th February, 1906.
Nottingham. University College in respect of its Diploma of Mining Engineering.	28th March, 1906.
Oxford and Birmingham Universities in respect of the Diploma in Coal Mining which is granted by the two Universities jointly.	24th May, 1921.

<i>Name of Institution and Degree or Diploma.</i>	<i>Date of Approval.</i>
Royal School of Mines in respect of its Associateship in Mining.	24th March, 1904.
Sheffield University in respect of its Diploma in Mining.	6th June, 1906.
Sheffield University in respect of its Degree of Bachelor of Engineering (Mining).	30th June, 1906.
University College of South Wales and Monmouthshire and the South Wales and Monmouthshire School of Mines, in respect of the Diploma which is granted by the two Institutions jointly.	13th March, 1914.
Wales, University of, in respect of its Degree of B.Sc. in Mining Engineering.	14th March, 1914.
Wigan Mining and Technical College in respect of its Diploma in Mining.	26th August, 1904.

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APPENDIX IX.

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EXAMINATIONS FOR SURVEYORS' CERTIFICATES

INSTITUTIONS WHOSE COURSES OF INSTRUCTION IN SURVEYING  
HAVE BEEN APPROVED FOR THE PURPOSES OF CLAUSE 3 (A) (II)  
OF THE COAL MINES (PRESCRIPTION OF QUALIFICATIONS OF  
SURVEYORS), ORDER, 1923.\*

Heriot-Watt College, Edinburgh.

Leeds University.

Royal School of Mines, London.

Royal Technical College, Glasgow (two courses).

Sheffield University (two courses).

South Wales and Monmouthshire School of Mines, Treforest.

University College, Nottingham—

(a) Diploma Course in Mine Surveying.

(b) Degree Course in Mining and Mine Surveying.

(c) Part-time Day Course in Mining and Mine Surveying

University College of South Wales and Monmouthshire  
Cardiff.

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\* See page 108.

APPENDIX X.

MEMORANDUM ON FIREMEN'S, EXAMINERS' AND DEPUTIES'  
CERTIFICATES. (JUNE, 1912.)

1. After 1st January, 1913, no person can be appointed to act as a fireman, examiner or deputy, and no person already employed as a fireman, examiner or deputy can continue to be so employed, unless he has obtained a fireman's certificate as required by the Coal Mines Act, 1911, Section 15. *This requirement applies to all firemen, examiners or deputies.* No exception is made for persons holding managers' or under-managers' certificates.

A full certificate for a firemen, examiner or deputy certifies three things :—

- (1) that he can test for gas with a safety lamp,
- (2) that he can measure an air current,
- (3) that his hearing is good.

All firemen, &c., appointed *after the passing of the Act (i.e., after 16th December, 1911)* have to obtain a full certificate, with the exception only of firemen, &c., employed in mines in which inflammable gas is unknown, who are required to obtain a certificate as to (2) and (3) only, and not as to (1).

On the other hand, firemen, &c., who were appointed *before the passing of the Act* are exempted from obtaining a certificate as to (2), and need only obtain a certificate as to (1) and (3), or (if employed in a mine in which inflammable gas is unknown) need only obtain a certificate as to (3).

2. The certificate can only be obtained from one of the approved Mining Schools, Institutions or Authorities (*see List in Appendix 1*), and in order to obtain it a candidate must pass an examination in the subjects mentioned in paragraph 4 below. A candidate is allowed to sit at any examination for the purpose held by any of the Approved Schools, Institutions or Authorities; and the Approved Schools, Institutions and Authorities have been asked to arrange to hold examinations as far as possible locally in centres convenient to the workers. For information as to the times and places of examinations held by any such School, &c., write to the Secretary of the School, &c.

3. *It is not necessary that a candidate before examination should have attended the classes of the School or Institution or Authority to which he present himself for examination or the classes of any other School, Institution or Authority.* The examination is mainly of a practical character and only requires such knowledge as a fireman of experience should have already acquired.

Men, however, who have not previously held the post of fireman, examiner or deputy, and no doubt many also who have held the post, will require, before going in for the examination, to have some instruction; and classes have been formed in most mining

districts for the purpose of giving instruction in the subjects in which candidates for certificates will be examined.

A word of explanation may be useful here, as there has been some misapprehension among firemen, &c., as to the nature of the instruction required.

In some districts where classes of an advanced character have been formed it has been supposed that it was necessary to attend these classes in order to qualify for a certificate. This is a mistake. The duties of a fireman, examiner or deputy include, indeed, other matters besides the detection of gas and the measurement of air, and it is very advantageous that a fireman, &c., should have as thorough a knowledge as possible with regard to all matters which may bear upon his duties, but it should be clearly understood that this advanced instruction is not required for the fireman's certificate under the Act and that the only matters in which a candidate need obtain instruction for the purpose of getting a certificate are the subjects mentioned in paragraph 4 below.

*4. The Subjects of Examination will be those set out below in this paragraph, and those only. A candidate will not be asked any questions in regard to any other matter.*

#### Part I.—Gas Tests.

A candidate will be required to show that he is able to make accurate tests for inflammable gas, and that he can do this with any of the various kinds of safety lamp, and with any of the various kinds of oil, *in use in the district in which he is employed.* For this purpose he will be required, *first*, to show to the examiner that he understands the method of detecting inflammable gas by means of a safety lamp; and, *secondly*, to make correct observations of gas caps as they appear on the flames of various kinds of safety lamps burning the various kinds of oil. By a correct observation is meant that the candidate must be able to judge by the size and appearance of the cap how much gas approximately is present. He will be tested with percentages of gas from 2 per cent. upwards and no candidate will pass who is unable to see a 2 per cent. cap.

A candidate who ordinarily wears glasses will not necessarily be called upon to make the observations without them, but it will rest with the examiner to decide by such test as he thinks fit whether the eyesight is so defective that under the working conditions in a mine a candidate would not be able to make accurate observations.

#### Part II.—Air Measurements.

A candidate will be required to show that he can measure the quantity of air in an air current. The quantity of air, in cubic feet per minute, passing through the airway of a mine being found by multiplying the number of square feet in the cross-section of the airway by the speed of the air current in feet per

minute, the candidate will be required, *first*, to measure the speed of the air current passing through the airway of a mine, or through some gallery corresponding to or representing the airway of a mine, both (i) by means of an anemometer, and (ii) by observing the speed at which dust or smoke is carried by the air current; and, *secondly*, to calculate from measurements the size (*i.e.*, cross-sectional area) of the airway or gallery in which the air to be measured is passing.

### Part III.—Hearing.

The candidate's hearing will be tested. The Act requires that his hearing should be such as to enable him to carry out his duties efficiently. This does not mean that a fireman must possess a standard of hearing above that of the average man, nor is it required that his hearing must be up to the standard in both ears. If the candidate is able to hear sounds audible to the average man it will be sufficient. The tests will usually be of a simple nature and will naturally be varied by the examiner with different candidates at different times.

5. A candidate who claims to be exempted from Part I of the examination must produce to the School, &c., to which he presents himself for examination a certificate from the Manager of his mine that he is employed in a mine in which firedamp is unknown. Note, however, that a fireman, &c., employed in a mine in which gas is unknown, who claims exemption from Part I, would have to pass this part of the examination afterwards if at any time he obtained employment as a fireman, &c., in a gassy mine.

A candidate who claims to be exempted from Part II must produce a certificate from his Manager that he was employed as a fireman, examiner or deputy on the 16th December, 1911.

6. Each candidate will be examined separately, and not in the presence of other candidates.

7. A fee for the examination will be payable by the candidate in accordance with the scale in *Appendix 2*.

8. The Act provides also for further certificates as to eyesight and hearing to be obtained by a fireman, examiner or deputy, at intervals of five years. The object of these further certificates is to ensure that a fireman's eyesight continues to be such as to enable him to make accurate tests for firedamp, and that his hearing continues to be such as to enable him to carry out his duties efficiently. The first of these certificates will not be required until the expiration of five years from the date on which he got his fireman's certificate as above. A fireman, examiner or deputy will be able to get this five-yearly certificate either from one of the Approved Schools, Institutions or Authorities or from a doctor selected by himself. The fee for obtaining this certificate will be payable by the fireman's employer.

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*Appendix 1.*

SCHOOLS, INSTITUTIONS AND AUTHORITIES APPROVED FOR THE  
PURPOSE OF GRANTING CERTIFICATES TO FIREMEN, &C., AND  
TO SHOTFIRERS.

SCOTLAND

Heriot-Watt College, Edinburgh.  
Royal Technical College, Glasgow.

NORTHERN DIVISION.

Cumberland Education Committee.  
Durham County Education Committee.  
Newcastle-upon-Tyne Education Committee.  
Northumberland Education Committee.  
Yorkshire—North Riding Education Committee.

YORK AND NORTH MIDLAND DIVISION.

Barnsley Education Committee.  
Batley Education Committee.  
Cleckheaton Technical Institute.  
Derbyshire Education Committee.  
Dewsbury Technical School.  
Doncaster Education Committee.  
Huddersfield Technical College.  
Leeds Education Committee.  
Nottinghamshire Education Committee.  
Rotherham Education Committee.  
Sheffield Education Committee.  
Sheffield University.  
University College of Nottingham.  
Wakefield Education Committee.  
Yorkshire—West Riding Education Committee.

LANCASHIRE AND NORTH WALES DIVISION.

Accrington Education Committee.  
Ashton-in-Makerfield Urban District Council Higher Educa-  
tion Committee.  
Atherton Urban District Council Higher Education Com-  
mittee.  
Burnley Education Committee.  
Flintshire Education Committee.  
Leigh Education Committee.  
Manchester Municipal School of Technology.  
St. Helens Education Committee.  
Tyldesley Higher Education Committee.  
Wigan and District Mining and Technical College.  
Worsley Urban District Council Higher Education Com-  
mittee.  
Wrexham ; School of Science and Art.

## SOUTH WALES DIVISION.

Breconshire Education Committee.  
 Carmarthenshire Education Committee.  
 Glamorganshire Education Committee.  
 Merthyr Tydfil Education Committee.  
 Monmouthshire Education Committee.  
 Swansea Local Education Authority.

## MIDLAND AND SOUTHERN DIVISION

Birmingham University.  
 Derbyshire Education Committee.  
 Gloucestershire Education Committee.  
 Kent Education Committee.  
 Oswestry Technical Institute.  
 Somerset County Education Committee.  
 Stoke-on-Trent Education Committee.

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*Appendix 2.*


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 SCALE OF FEES.

(1) For the full examination (*i.e.*, gas tests, air measurements and hearing), 7s. 6*d.*

(This will only apply in the case of new firemen appointed after the passing of the Act.)

(2) For the candidates taking two parts only of the examination (*e.g.*, gas tests and hearing), 5s.

(This will be the fee for most existing firemen), *i.e.*, firemen appointed before the passing of the Act.)

(3) For candidates taking only one part (*i.e.*, existing firemen employed in mines in which gas is unknown who will be examined as to their hearing only), 2s. 6*d.*

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## COAL MINES ACT, 1911.

### Regulations and Statutory Orders.

The regulations and orders contained in this volume are also published separately as follows :—

<b>General Regulations of July 10, 1913</b> (main code of General Regulations under the Coal Mines Act, 1911)	1913 No. 748
	[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]
<b>Amending Regulations of May 19, 1914</b> (mines served by a Central Rescue Corps : definition of " Breathing Apparatus ")	1914 No. 710
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Additional Regulations of July 30, 1920.</b> (Precau- tions against Coal Dust and Spontaneous Combustion ; Rescue ; Electricity on Surface ; Workings under Moss, &c. ; Miscellaneous)	1920 No. 1423
	[Price 4 <i>d.</i> ; by Post 4½ <i>d.</i> ]
<b>Amending Regulations of 20th November, 1924</b> (Precautions against Coal Dust)	1924 No. 1364
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Regulations as to Washing and Drying Accommoda- tion, &amp;c.</b>	1913 No. 950
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Regulations as to Hours of Winding Enginem</b>	1913 No. 341
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Regulations as to Ganister Mines</b>	1920 No. 873
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Breathing Apparatus.</b>	
<b>Breathing Apparatus Order of the 7th February, 1924</b> (Issued in pursuance of General Regulations of 30th July, 1920)	1924 No. 133
	[Price 9 <i>d.</i> ; by Post 9½ <i>d.</i> ]
<b>Coal Dust—Precautions against</b> (special prescribed tests for certain dust mixtures. Issued in pur- suance of General Regulations of 30th July, 1920).	
<b>Dust mixtures which contain carbonates</b>	1921 No. 200
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Moist dust mixtures which cannot be sieved</b>	1921 No. 201
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Dust mixtures which contain gypsum</b>	1921 No. 1657
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Explosives.</b>	
<b>Explosives in Coal Mines Order of the 1st September, 1913</b> (regulating the supply, use and storage of explosives)	1913 No. 953
	[Price 9 <i>d.</i> ; by Post 9½ <i>d.</i> ]
<b>Amending Orders :—</b>	
<b>Detonators—Storage and use</b> (Clause 1 (e)) (30th March, 1915)	1915 No. 278
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Detonators—Only copper capsule detonators per- mitted in fiery and dusty mines</b> (10th November, 1926)	1926 No. 1404
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
<b>Revised and Consolidated List of Permitted Ex- plosives</b> (14th November, 1919)	1919 No. 1687
	[Price 3 <i>d.</i> ; by Post 4 <i>d.</i> ]
<b>Non-detonating explosives—extension of period during which they may be used</b> (Clause 11) (27th October, 1925)	1925 No. 1088
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Explosives—continued.**

Precautions to be taken in the event of a shot missing fire (Clause 3) (31st August, 1922)	.. .. .	1922	No. 1000
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Prescribing qualifications of shotfirers and additional shofiring precautions (Clause 6) (1st September, 1924)	.. .. .	1924	No. 1016
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Additional Permitted Explosives :—**

6th March, 1920	.. .. .	1920	No. 382
			[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]
25th August, 1920	.. .. .	1920	No. 1621
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
27th June, 1921	.. .. .	1921	No. 1102
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
5th October, 1921	.. .. .	1921	No. 1562
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
9th November, 1921	.. .. .	1921	No. 1701
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
31st December, 1921	.. .. .	1921	No. 2033
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
8th March, 1922	.. .. .	1922	No. 209
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
22nd July, 1922	.. .. .	1922	No. 790
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
31st August, 1922	.. .. .	1922	No. 1000
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
12th October, 1922	.. .. .	1922	No. 1124
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
15th February, 1923	.. .. .	1923	No. 150
			[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]
13th April, 1923	.. .. .	1923	No. 438
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
19th July, 1923	.. .. .	1923	No. 831
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
27th Mav, 1924	.. .. .	1924	No. 606
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
29th July, 1924	.. .. .	1924	No. 816
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
18th September, 1924	.. .. .	1924	No. 1068
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
19th January, 1925	.. .. .	1925	No. 27
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
16th June, 1925	.. .. .	1925	No. 559
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
23rd September, 1925	.. .. .	1925	No. 957
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
30th January, 1926	.. .. .	1926	No. 98
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
14th July, 1926	.. .. .	1926	No. 887
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
8th November, 1926	.. .. .	1926	No. 1392
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
7th January, 1927	.. .. .	1927	No. 10
			[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]

**Firemen's and Shotfirers' Certificates.**

Prescribing Form of certificate of qualification	.. .. .	1912	No. 450
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Prescribing Form of certificate as to Eyesight and Hearing	.. .. .	1917	No. 919
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Managers' and Under-Managers' Certificates.**

Times and places for holding examinations .. ..	1915	No. 181	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Rules for the conduct of examinations .. ..	1912	No. 1150	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Do. do. —Amending Rule .. ..	1914	No. 402	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Rules as to qualifications of applicants .. ..	1926	No. 1738	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Rules as to qualifications of applicants who have served in H.M. Forces .. ..	1917	No. 126	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Do. Do. —Amending Rules .. ..	1917	No. 1351	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Fees to be paid by applicants for certificates .. ..	1920	No. 1763	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Fees for copies of lost certificates .. ..	1912	No. 1538	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Safety Lamp Mines.**

Use below ground of apparatus for the relighting elec- trically of safety lamps .. ..	1912	No. 1628	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Search of persons employed for prohibited articles .. ..	1912	No. 510	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Safety Lamps Orders :—**

(These orders approve various types of Safety Lamps and brands of Safety Lamp Glasses.)

26th August, 1913 .. ..	1913	No. 886	
			[Price 1 <i>s.</i> ; by Post 1 <i>s.</i> 2½ <i>d.</i> ]
9th March, 1914 .. ..	1914	No. 316	
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
16th March, 1914 .. ..	1914	No. 345	
			[Price 2 <i>s.</i> 6 <i>d.</i> ; by Post 2 <i>s.</i> 7½ <i>d.</i> ]
1st July, 1914 .. ..	1914	No. 1002	
			[Price 4 <i>d.</i> ; by Post 4½ <i>d.</i> ]
7th October, 1914 .. ..	1914	No. 1510	
			[Price 6 <i>d.</i> ; by Post 7 <i>d.</i> ]
16th March, 1915 .. ..	1915	No. 249	
			[Price 8 <i>d.</i> ; by Post 9 <i>d.</i> ]
22nd April, 1915 .. ..	1915	No. 366	
			[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]
15th June, 1915 .. ..	1915	No. 592	
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
15th May, 1916 .. ..	1916	No. 341	
			[Price 5 <i>d.</i> ; by Post 5½ <i>d.</i> ]
16th November, 1916 .. ..	1916	No. 794	
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
9th March, 1918 .. ..	1918	No. 324	
			[Price 5 <i>d.</i> ; by Post 5½ <i>d.</i> ]
30th July, 1918 .. ..	1918	No. 980	
			[Price 2 <i>d.</i> ; by Post 2½ <i>d.</i> ]
25th October, 1918. (Glasses) .. ..	1918	No. 1419	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
29th March, 1919. (Glasses) .. ..	1919	No. 433	
			[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
13th December, 1919 .. ..	1919	No. 1902	
			[Price 3 <i>d.</i> ; by Post 3½ <i>d.</i> ]
1st December, 1920 .. ..	1920	No. 2264	
			[Price 6 <i>d.</i> ; by Post 7 <i>d.</i> ]
20th April, 1921 .. ..	1921	No. 672	
			[Price 6 <i>d.</i> ; by Post 6½ <i>d.</i> ]

**Safety Lamps Orders—continued.**

18th June, 1921 .. .. .	.. .. .	1921 No. 1045
		[Price 6 <i>d.</i> ; by Post 6½ <i>d.</i> ]
16th December, 1921 .. .. .	.. .. .	1921 No. 1901
		[Price 6 <i>d.</i> ; by Post 6½ <i>d.</i> ]
31st March, 1922 .. .. .	.. .. .	1922 No. 318
		[Price 6 <i>d.</i> ; by Post 6½ <i>d.</i> ]
21st September, 1922 .. .. .	.. .. .	1922 No. 1058
		[Price 9 <i>d.</i> ; by Post 9½ <i>d.</i> ]
9th May, 1923 .. .. .	.. .. .	1923 No. 573
		[Price 6 <i>d.</i> ; by Post 6½ <i>d.</i> ]
21st September, 1923. (Glasses) .. .. .	.. .. .	1923 No. 1140
		[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
27th October, 1923 .. .. .	.. .. .	1923 No. 1272
		[Price 5 <i>d.</i> ; by Post 5½ <i>d.</i> ]
24th November, 1924 .. .. .	.. .. .	1924 No. 1345
		[Price 8 <i>d.</i> ; by Post 8½ <i>d.</i> ]
19th October, 1925. (Glasses) .. .. .	.. .. .	1925 No. 1055
		[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
3rd May, 1926 .. .. .	.. .. .	1926 No. 534
		[Price 7 <i>d.</i> ; by Post 7½ <i>d.</i> ]
30th June, 1926 (Glasses) .. .. .	.. .. .	1926 No. 811
		[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Surveyors' Certificates.**

Times and Places for holding Examinations .. .. .	1915 No. 181
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Fees to be paid by applicants for Surveyors' Certificates .. .. .	1921 No. 650
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Prescription of qualifications of Surveyors .. .. .	1923 No. 816
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**Miscellaneous.**

Hours of employment of winding enginemen—pre- scribing data under Section 57 (3) .. .. .	1913 No. 341
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Manner of settling disputes; time and manner of serving notice .. .. .	1912 No. 1539
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Use of horses and other animals in mines .. .. .	1922 No. 113
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Horses in Coal Mines (Glanders) Order of 12th March, 1923 .. .. .	1923 No. 313
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Procedure and costs of references in regard to cost of maintenance of washing and drying accommodation .. .. .	1913 No. 955
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Procedure before Referees and cost of proceedings .. .. .	1913 No. 10
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Procedure for ascertaining and certifying views of workmen .. .. .	1912 No. 634
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]
Mines and Quarries (Inspection Divisions) Order, dated 12th August, 1924 .. .. .	1924 No. 951
	[Price 1 <i>d.</i> ; by Post 1½ <i>d.</i> ]

**SHORT LIST OF PARLIAMENTARY AND OTHER OFFICIAL PUBLICATIONS RELATING TO COAL MINES.****Periodical Publications.**

The following publications are issued annually, except the list of plans of abandoned mines, which was last issued in 1920 (corrected to 31st December, 1919), and the Statistical Summaries of Output, &c., which are issued quarterly. In the case of the Annual publications the references in each

**Periodical Publications—continued.**

case are to the latest issue at the time of going to press. Particulars of earlier issues can be obtained from the addresses mentioned on the front of this volume.

	Reference Number.	Price.	With Postage.
5th Annual Report of the Secretary for Mines for the year ending 31st December, 1925, and the Annual Report of H.M. Chief Inspector of Mines for the same period. . . . .	—	6s. 0d.	6s. 3d.
Report of H.M. Electrical Inspector of Mines, 1925 . . . . .	—	0s. 6d.	0s. 6½d.
Reports of H.M. Divisional Inspectors of Mines, 1925 :—			
1. Scotland Division . . . . .	—	1s. 0d.	
2. Northern Division . . . . .	—	1s. 0d.	
3. Yorkshire Division . . . . .	—	1s. 0d.	
4. North Midland Division . . . . .	—	1s. 0d.	
5. Lancashire and North Wales Division . . . . .	—	1s. 0d.	
6. Cardiff and Newport Division . . . . .	—	1s. 0d.	
7. Swansea Division . . . . .	—	1s. 0d.	
8. Midland and Southern Division . . . . .	—	1s. 0d.	
List of Mines in the United Kingdom (1925) . . . . .	—		
List of Plans of Abandoned Mines deposited in the Mines Department, corrected to 31st December, 1919 . . . . .	—	4s. 6d.	4s. 11d.
Preliminary Statement (subject to correction) of the Number of Deaths caused by Accidents in and about the Mines and Quarries of Great Britain, together with the Isle of Man, during the year 1925 . . . . .	—	0s. 4d.	0s. 4½d.
Statistical Summaries of output and of the costs of production, proceeds and profits of the Coal Mining Industry :—			
These summaries have been issued quarterly since the quarter ended 31st March, 1920. They were priced at 1d. each (1½d. with postage) for the issues to 31st March, 1921 (inclusive). For the June, 1921, issue and subsequent issues to June, 1924, inclusive, the price was raised to 2d. (2½d. with postage). Since that date they have been priced at 1d. (1½d. with postage). Particulars of recent issues are as follows :—			
Quarter ended 31st March, 1925 . . . . .	Cmd. 2431	1d.	1½d.
"    "    30th June, 1925 . . . . .	Cmd. 2507	1d.	1½d.
"    "    30th Sept., 1925 . . . . .	Cmd. 2550	1d.	1½d.
"    "    31st Dec., 1925 . . . . .	Cmd. 2606	1d.	1½d.
"    "    31st March, 1926 . . . . .	Cmd. 2678	1d.	1½d.
Coal Tables, 1924. Return containing Statistics relating to the Production, Consumption, and Imports and Exports of Coal in the British Empire and the principal Foreign countries in years (1925) . . . . .	H.C. 168	1s. 0d.	1s. 1d.

**Special Reports on Colliery Accidents.**

[The following is a complete list of the Reports published since 1922: the date of the accident is given in brackets.]

Explosion at East Plean Colliery, Bannockburn, by T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (13th July, 1922) . . . . .	Cmd. 1805	3s. 0d.	3s. 3d.
Explosion at Haig Pit, Whitehaven Collieries, Cumberland, by T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (5th Sept., 1922) . . . . .	Cmd. 1796	3s. 0d.	3s. 3½d.

Special Reports on Colliery Accidents—*continued.*

	Reference Number.	Price.	With Postage:
Explosion at St. Helens No. 3 Colliery, Workington, by T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (27th Nov., 1922) .. .. .	Cmd. 1828	2s. 0d.	2s. 2d.
Explosion at Wheldale Colliery, Castleford, by T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (22nd Feb., 1923) .. .. .	Cmd. 1907	2s. 6d.	2s. 9½d.
Accident in Busty Shaft of Medomsley Colliery, Co. Durham, by H. Walker, C.B.E., H.M. Deputy Chief Inspector of Mines (24th Feb., 1923) .. .. .	Cmd. 1965	1s. 0d.	1s. 2d.
Explosion at Maltby Main Colliery, Yorkshire, by Sir T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (28th July, 1923) .. .. .	Cmd. 2047	3s. 0d.	3s. 2½d.
Accident at Gartshore Colliery, Dumbartonshire, by H. Walker, C.B.E., H.M. Deputy Chief Inspector of Mines (28th July, 1923) .. .. .	Cmd. 2139	0s. 9d.	0s. 10½d.
Inrush of Water at Redding Colliery, Falkirk, by Sir T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (25th Sept., 1923) .. .. .	Cmd. 2136	3s. 0d.	3s. 3d.
Underground Haulage Accident at Nunnery Colliery, Sheffield, by Sir T. H. Mottram, C.B.E., H.M. Chief Inspector of Mines (3rd Dec., 1923) .. .. .	Cmd. 2246	1s. 0d.	1s. 2d.
Explosion at East Pit of Birley Colliery, Beighton, by H. Walker, C.B.E., H.M. Chief Inspector of Mines (23rd Feb., 1924) .. .. .	Cmd. 2276	1s. 0d.	1s. 0½d.
Explosion at the Hartley Bank Colliery, Nether-ton, Yorkshire, by H. Walker, C.B.E., H.M. Chief Inspector of Mines (23rd May, 1924) .. .. .	Cmd. 2364	0s. 6d.	0s. 7d.
Explosion at the Llay Main Colliery, Wrexham, Denbighshire, by A. D. Nicholson, H.M. Divisional Inspector of Mines (5th December, 1924) .. .. .	Cmd. 2365	0s. 6d.	0s. 7d.
Inrush of Water at the View Pit of the Montagu Colliery, Scotswood, Northumberland, by the Rt. Hon. Hugh Pattison MacMillan, K.C. (30th March, 1925) .. .. .	Cmd. 2607	1s. 3d.	1s. 4½d.
Winding Accident at Brownlee No. 2 Pit, Shawfield Colliery, Carlisle, Lanarkshire, by H. Walker, C.B.E., H.M. Chief Inspector of Mines (5th May, 1925) .. .. .	Cmd. 2585	6d.	6½d.
Shaft Accident at No. 2 Shaft, Thorne Colliery, Thorne, Yorkshire, by Major H. M. Hudspeth, D.S.O., M.C., M.Sc., H.M. Divisional Inspector of Mines (15th March, 1926) .. .. .	Cmd. 2627	4d.	5d.

## Reports of Commissions, Committees, &amp;c.

Royal Commission on the Coal Industry, (1925)—			
Vol. I.—Report (1926) .. .. .	Cmd. 2600	3s.	7½d.
„ II.—(Parts A. and B.) Minutes of Evidence (1926) .. .. .	—	25s. 0d.	26s. 0d.
„ III.—Appendices and Index (1926) .. .. .	—	15s. 0d.	15s. 9d.
Advisory Committee for Coal and the Coal Industry—			
Report on the Possibility of Effecting Economies in the Costs that make up the Price of Coal to the Consumer (1923) .. .. .	—	2s. 6d.	2s. 7d.

Commissions, Committees, &c.—*continued.*

	Reference Number.	Price.	With Postage.
Reports of the Committee on the Co-operative Selling of Coal (1926) .. .. .	Cmd.		
Mine Rescue Apparatus Research—			
First Report (1918) .. .. .	—	1s. 9d.	1s. 10½d.
Second Report (1920) .. .. .	—	2s. 0d.	2s. 2d.
Third and Final Report (1924) .. .. .	—	1s. 0d.	1s. 2d.
Rescue Regulations Committee—			
Report on the existing arrangements for the provision and maintenance of Rescue Appliances and for the formation and training of Rescue Corps and Brigades (1926) .. .. .	—	1s. 6d.	1s. 7d.
Miners' Lamps Committee:—			
Memorandum No. 1—Research on passage of flame of explosion through wire gauze (1920) .. .. .	—	1s. 0d.	1s. 1½d.
Do. No. 2—Use of celluloid in con- struction of miners' electric lamps (1921) .. .. .	—	3d.	4d.
Do. No. 3—Supply of spare parts for repair and re- newal of safety lamps (1921) .. .. .	—	3d.	4d.
Do. No. 4—Research on passage of flame through per- forated plates and tubes of small dia- meter (1921).. .. .	—	9d.	10d.
Do. No. 5—Research on passage of flame of explosion from within miners' lamps fitted with chimneys (1921) .. .. .	—	6d.	7d.
Do. No. 6—Lamproom organiza- tion and upkeep of safety lamps (1922) .. .. .	—	9d.	10d.
Do. No. 7—Report on the General Use by Workmen of Safety Lamps which give no indication of Inflammable or Noxious Gases (1923) .. .. .	—	6d.	6½d.
Do. No. 8—Record of Research on the Testing of Wire Gauzes in Currents of Explosive Mixtures (1923) .. .. .	—	4d.	4½d.
Do. No. 9—Report on the Relight- ing of Lamps Under- ground (1924) .. .. .	—	3d.	4½d.
Do. No. 10—Report on Testing for Firedamp (1924) .. .. .	—	1s. 6d.	1s. 7½d.
Do. No. 11—Final Report (1924) .. .. .	—	9d.	10d.
Minutes of Evidence with Index, and an appendix of the law of foreign countries in regard to safety lamps and their upkeep (1922) .. .. .	—	30s.	31s.





Commissions, Committees, &c.—*continued.*

	Reference Number.	Price.	With Postage.
<b>Miners' Nystagnus Committee—</b>			
First Report (1922) .. .. .	—	1s. 6d.	1s. 7½d.
Second Report (1923) .. .. .	—	9d.	10d.
Report on Miners' "Beat Knee," "Beat Hand" and "Beat Elbow" (1924) ..	—	1s. 6d.	1s. 7½d.
<b>Miners' Welfare Fund Committee—</b>			
First Report, 1921-22 (1923) .. .. .	—	1s. 6d.	1s. 7d.
Second Report, 1923 (1924) .. .. .	—	2s. 0d.	2s. 1½d.
Third Report, 1924 (1925) .. .. .	—	2s. 6d.	2s. 8d.
Fourth Report, 1925 (1926) .. .. .	—	2s. 6d.	2s. 8d.

**Other Reports and Miscellaneous Publications.**

<b>Retail Prices and Qualities of Household Coal :</b>			
Correspondence between the Mines Department and the Coal Merchants' Federation of Great Britain, together with the Report of a Conference between the Secretary for Mines and the Federation (1924) .. ..	Cmd. 2117	9d.	9½d.
Report of a Conference between the Secretary for Mines and Representatives of the Co-operative Societies (1924) .. .. .	Cmd. 2185	9d.	9½d.
Report by a Court of Inquiry Concerning the Wages Position in the Coal Mining Industry (1924) .. .. .	Cmd. 2129	6d.	6½d.
Report by a Court of Inquiry Concerning the Coal Mining Industry Dispute, 1925 (1925)..	Cmd. 2478	6d.	6½d.
Coal Mining Industry Dispute, 1925. Explanatory Memorandum of Terms of Settlement (1925) .. .. .	Cmd. 2488	2d.	2½d.
Statement giving for each month from Jan., 1924, to March, 1925, the number and Output of Colliery Undertakings in Great Britain, showing Credit Balances and Debit Balances respectively (1925) .. .. .	Cmd. 2454	2d.	2½d.
Return of Colliery Accident Funds in Great Britain raised prior to Dec. 31st, 1924 (1925)	H.C. 155	3d.	3½d.
Electric Storage Battery Locomotive Competition: Report of the Judges upon the Locomotives which competed for the prize of £1,000 offered by Mr. Charles Markham (1926) .. .. .	—	1s. 3d.	1s. 4d.

**Official Memoranda.**

How to Test for Firedamp (Mines and Quarries Form No. 87) (1924) .. .. .		3d.	4d.
"Safety First." How Accidents in and about Mines could have been Avoided (1924) .. .. .		1d.	1½d.
S.F. Pamphlet No. 2. More Recent Accidents in and about Mines which could have been avoided had "Safety First" principles been observed (1925) ..		1d.	1½d.

A complete list of Parliamentary and other publications relating to the Mining and Quarrying Industry (Mines and Quarries Form No. 1) can be obtained directly, Price 2d. (postage ½d.), from the addresses indicated on the front of this publication.



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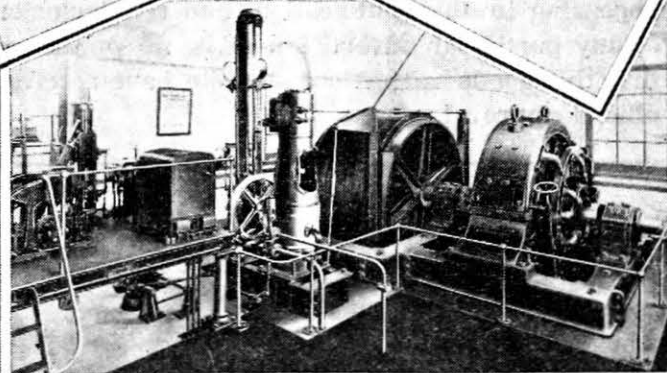
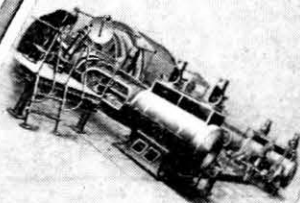
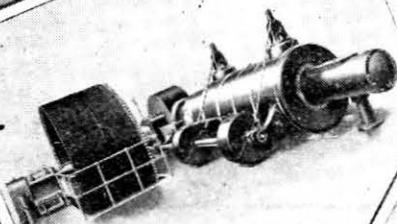
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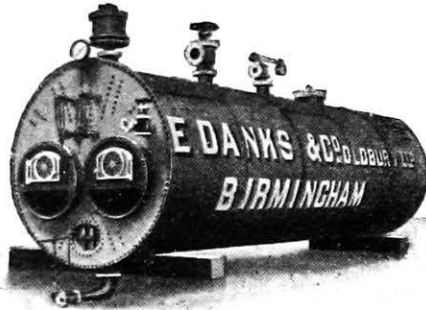
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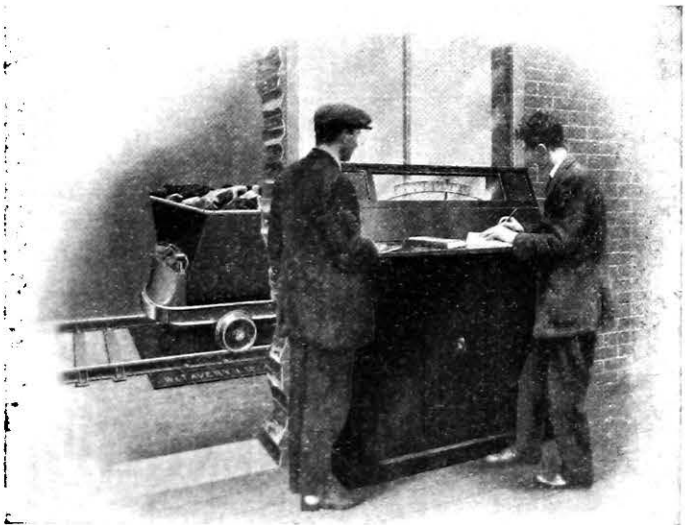
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# CEMENTATION—The François Process.

While not claiming any monopoly of "Cementation" in word or practice, it is none the less certain that modern cementation practice is so bound up and associated with the François Process that cementation, as distinct from grouting, has little significance except when employed with the François Cementation Process.

Grouting might be described as the filling of open or easily accessible cavities with liquid mortar by hand pouring, gravity filling, compressed air, or hand pumping. The François Cementation Process includes, in addition to this, the injection of the smallest and most remote fissures and the very pores of the rock itself with liquid cement by steam pumps after preliminary silicatization.

It would now be impossible to say when and where grouting was first used in mining. Probably the first fully authenticated case was in the injection of the shaft lining at the Rheinpreussen shaft in 1864 where the, for that time, high pressures of 210 lb. to the square inch was used. A considerable feeder of water behind an old wooden shaft lining was successfully injected at Courriers in 1900. Injections of liquid cement were actually employed during a shaft sinking in Germany by R. A. Weide at Pohlhauer, Saxe, in 1901. Early examples of its use in France were by Monsieur Remaux at Lens and by Monsieur Deffieux at the Mine de Males in 1908. The methods employed suffered from many disadvantages and cementation did not become recognised in mining until Monsieur A. J. François, in 1896, proved that it was possible to inject from the inside of a shaft below the permanent water level. In 1911, M. François introduced his partly developed process into England, where its possibilities were at once recognised by colliery engineers, and where he was given every opportunity to improve his patents and develop his process. It was in England that the necessity for using silicatization as an accessory to cementation became evident.

The finally developed process of cementation, silicatization and ferro-concrete walling was first employed by Mr. H. Berry at the sinkings of Hatfield Main Colliery, near Doncaster, and its successful development was markedly helped by the confidence and assistance of the Hatfield Main Colliery management. Over the previous crude systems this method was as distinctive and advanced as its success was marked, and its development proved an invaluable aid to the development of coal mines in wet areas. From England the perfected process was introduced into France, Belgium, Spain, Germany, and South Africa, and it is now recognised as being the cheapest and most effective known method of dealing with difficulties caused by the pressure of water or bad ground in any engineering or building works. Its efficiency in connection with colliery engineering is shown by the fact that in all 40 shafts have been successfully sunk by the François process, thereby obviating excessive and prohibitive costs. Furthermore, feeders of water in shafts and in mine workings, which have in many cases been pumped during the life of the mine, have been effectively and finally sealed.

In 1919, the various patents, processes, contracts, and works of M. François were purchased by a mining financial group in London, and the François Cementation Company Limited, with a

capital of £750,000, registered on December 17th, 1919, was formed to carry on and develop the business of M. Francois.

The process in itself is simple, but its successful application requires a wide range of experience, as no uniform rules or routine can be laid down. While specific cases differ very widely, the following general description of the sinking of a shaft may be of interest.

The shaft is sunk by ordinary methods until the presence of water is indicated by means of test holes. A number of holes are then bored in the shaft bottom, pipes being cemented in them, their number, position and inclination being dependent upon the size of the shaft and the character of the strata. Through these pipes boreholes are sunk by means of a diamond drill. On the tapping of feeders by one of the holes the boring is immediately stopped and the pipe in the hole connected by means of a length of high pressure flexible hose to a column of pipes in the shaft, leading in turn to a cement pump and mixing tank on the surface. The holes are arranged in series for cementation and silicatisation, and into them cement pulp and mixtures of chemicals are pumped. The strength and proportion of the mixtures of the chemicals, the percentage of cement, and the pressure employed being such as experience has shown to be best suited to the class of strata and pressure of water to be treated. The holes are cleaned out and re-injected or further deepened as necessary, the process being repeated with the various holes, boring and injecting of the different holes taking place simultaneously. The ground is treated in this manner until the desired length of ground has been rendered sufficiently watertight to allow mining and walling operations to proceed. The ground is excavated in the ordinary manner and reinforced concrete walling built up, any water not sealed off by the cementation of the boreholes being shut off by injections between the completed lining and the ground. On the walling being completed a second length of ground is excavated and walled, this procedure being continued till the water-bearing strata has been passed through. The lining employed through water-bearing or bad ground is ferro-concrete tubing of monolithic construction, which has many advantages over cast-iron tubing as shaft lining. In addition to being considerably cheaper for anything but shallow depths, it has many other advantages; for instance, it does not corrode; it does not require wedging, repairing, or renewing; it increases in strength with age; it is easily adaptable to change of size while sinking; it is not appreciably affected by temperature variations; with great inertia it has great flexibility.

In addition to removing or minimising water difficulties in sinking through water-bearing strata, the practical application of the Francois Process has solved many other problems in mining, by its successful application in the following ways:—

In enabling shafts to be carried through large cavities made by underground watercourses, and in passing through water-logged goafs without the aid of sinking pumps.

In damming back water in driving work so that the driving is carried out in dry ground and no pumps are required.

In shutting off leakage of water through defective shaft linings.

In sealing open fissures through which water is flowing.

In damming back water percolating through disturbed or broken ground.

- In consolidating underground barriers against inrush of water.
- In rendering underground dams watertight.
- In restricting fire areas underground.
- In preventing "creep."
- In rectifying defective boreholes.
- In consolidating and rendering impervious to the passage of water the foundations of surface dams.
- In consolidating foundations of all descriptions, ranging from the arrest of movement through insufficient stability of the foundations of great public buildings, down to ensuring the rigidity of an engine bed or boiler seat.
- In consolidating loose ground through which driving has to be done.

During the past year the process was employed at no fewer than twelve sinkings in addition to many minor works. These latter are of great importance to working collieries in eliminating burdensome pumping costs and often preventing destructive losses. To give a few concrete examples :—

**Shaft Sinking.**—In all over 40 shafts have been successfully sunk by the Francois Cementation Process in many varying classes of ground, in many different colliery districts, and through every kind of water-bearing strata. A few of these might be noted :—

- Hatfield Main in South Yorkshire.
- Harworth Main in Nottinghamshire.
- Blackhall Colliery in Durham.
- Kingshill Colliery in Scotland.
- Lyme Pits in Lancashire.
- Coventry Colliery in Warwickshire.
- Holditch Mine in Staffordshire.
- Agar Shaft in Cornwall.
- L'Ouest Neuville Colliery in Belgium.
- Armthorpe Colliery in Yorkshire.
- Ollerton Colliery in Nottingham.
- Thorne Colliery in Yorkshire.

**Shaft Lining with Ferro-Concrete Tubbing.**—Twelve of these shafts have been lined with the Francois patent ferro-concrete tubbing. The others, in which the static pressure was nil or negligible, being lined with plain concrete or brickwork.

**Repair Work.**—Altogether 70 shaft repair jobs have been carried out in Great Britain, including the sealing off of leakages through cast-iron and concrete tubbing, and brickwork and masonry lining; the replacement of cast-iron tubbing by ferro-concrete tubbing, and of brick or masonry walling by concrete walling; the solidifying of strata; the solidifying of shaft sidings; the securing of shaft eyes; the recovery and building up of collapsed shafts; the prevention of slip; and the closing off of faults. The repair of old furnace shafts at Hardwick and Monkwearmouth Colliery might be mentioned.

**Drifting.**—The Hughes Drift in Wales and the Ottange Drift in France might be especially mentioned.

**Tunnelling.**—For the sealing off of water and consolidation of strata—Bonnington Tunnel, Scotland, Mersey Tunnel, Tooting Broadway, Waterloo Station.

**Underground Barriers.**—To prevent inrush of water—Rothwell Haigh Colliery.

**Underground Dams.**—To be built absolutely watertight and to withstand any pressure. Among the ten of these that have been completed, might be mentioned those at Wingate Grange, and Point of Ayr Colliery.

Here, too, might be mentioned the injection of defective dams built by others, six of which jobs have been successfully completed.

**Shaft Plugs.**—Fifteen of these have been successfully placed.

**Extinguishing Colliery Fires by the Francois Process.**—Five of such jobs have been carried out at the following collieries :—Griff, Exhall, Blaenavon, Newdigate, Netherseal.

**Diamond Drilling.**—Very many such jobs have been completed in all classes of rock, and with this might be included percussive drilling for sampling purposes, boreholes for water, and the cementation of boreholes.

**Solidifying of Foundations and Ground below Foundations.**—Work of this kind has been carried out at :—Carlton Main, Woolcombers, Tees Iron Works, Heidelberg Stamp Battery, Colwick, Blackpool, Brantham Church, St. Paul's Cathedral.

**Cementation of River Gravel for Foundations of Bridge Piers.**—Forges de Blagny in France.

**Cementation of made-up Ground and water-logged Sea Sand for Foundations of Grain Elevators.**—Grain Elevators, Cape Town.

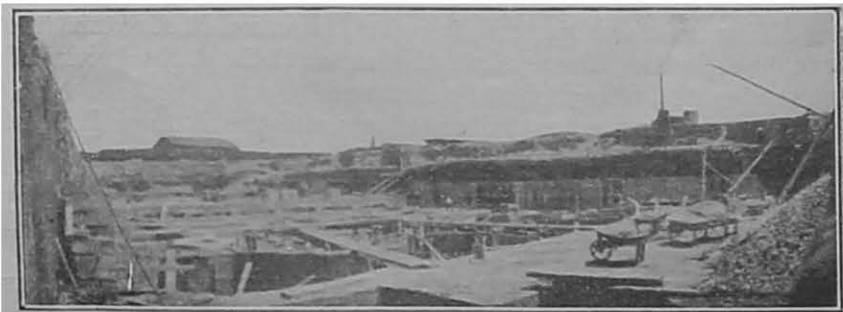
**Cementation of broken and fissured Rock to prevent the necessity of Excavation.**—Mazoe Dam, South Africa ; Barnsley, Birmingham and Batley Corporation Reservoir Dams.

**Repair by Cementation of Leaking Reservoir.**—Stobshiel Reservoir, in Scotland ; Hurstwood Reservoir and Upper Booth Dean Dam.

**Cementation of Loose Running Surface Ground for Excavation Purposes.**—Haugh Colliery, in Scotland.

Among the more important bibliographies on this subject might be mentioned the lecture given by Hugh F. Marriott at the Royal School of Mines on May 20th, 1919 ; the paper read by H. Standish Ball before the South Wales Institute of Engineers on December 16th, 1920 (Proceedings of South Wales Inst. Eng., Vol. xxxvi, No. 2) ; the paper by A. Hassam and T. T. Mawson (Trans. Inst. M.E., lviii ; Annales des Mines, Ser. xi, Vol. ix) ; and the papers read by H. Eustace Mitton, before the Midland Counties Institute of Engineers, October 15th, 1921, and Institute of Mining Engineers, November 4th, 1925.

Further information will be cheerfully supplied to those interested on application to the offices of the Francois Cementation Company, Limited, at Bentley Works, Doncaster.

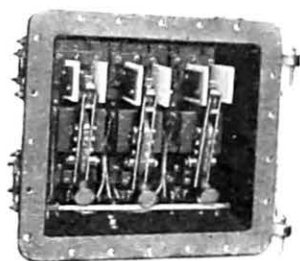


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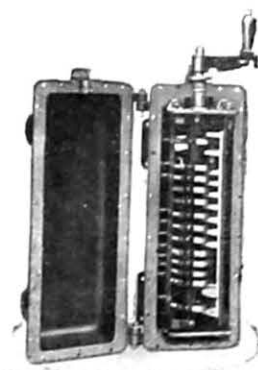
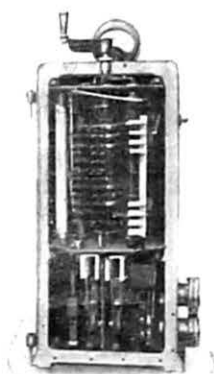
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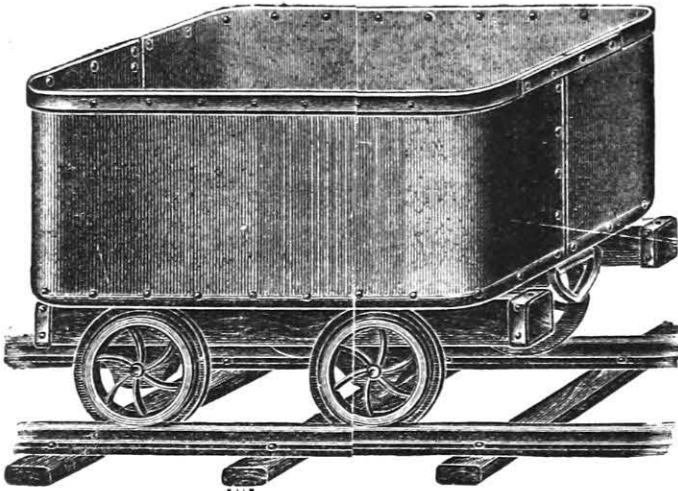
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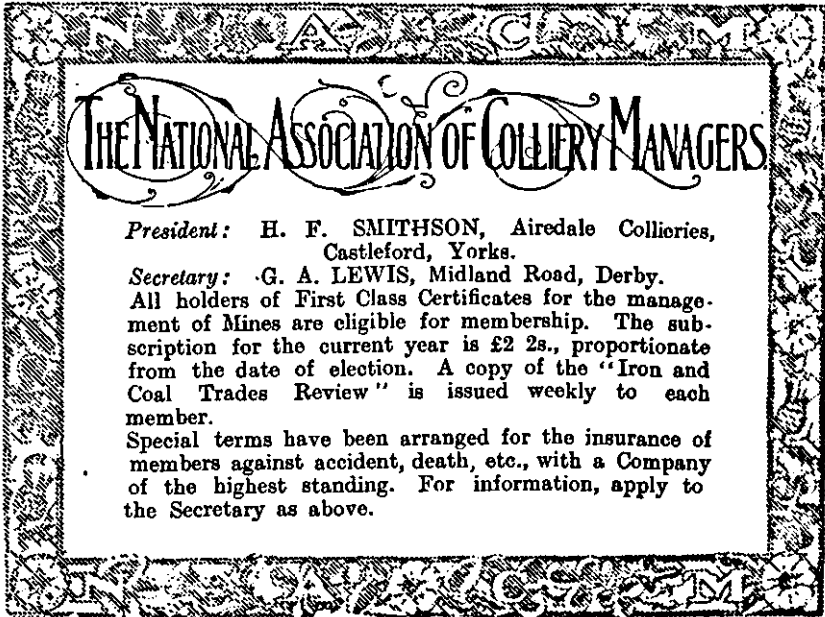
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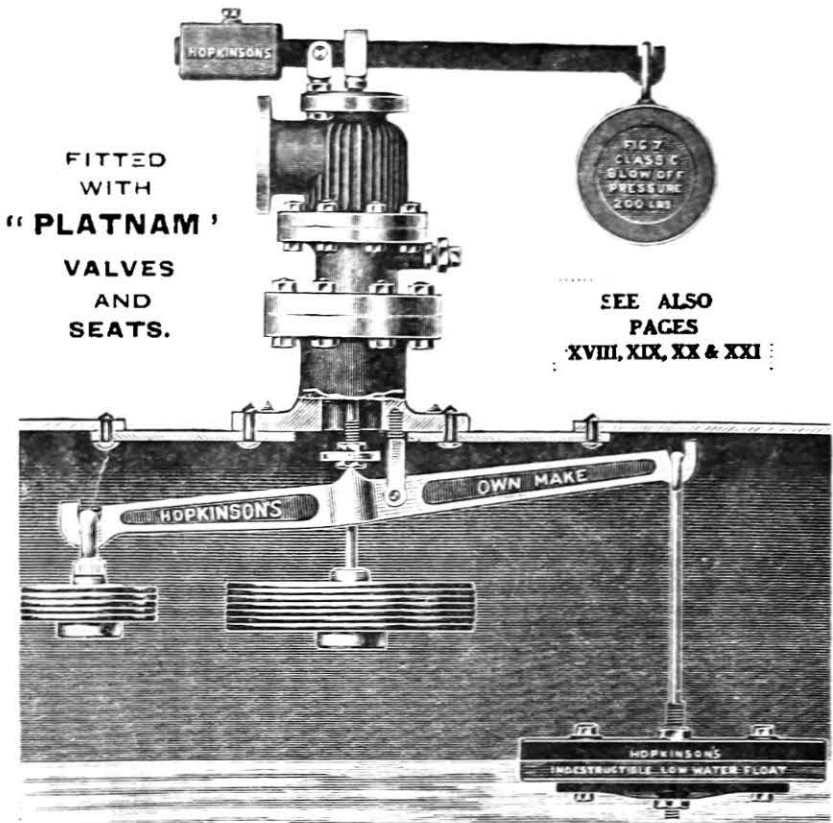
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